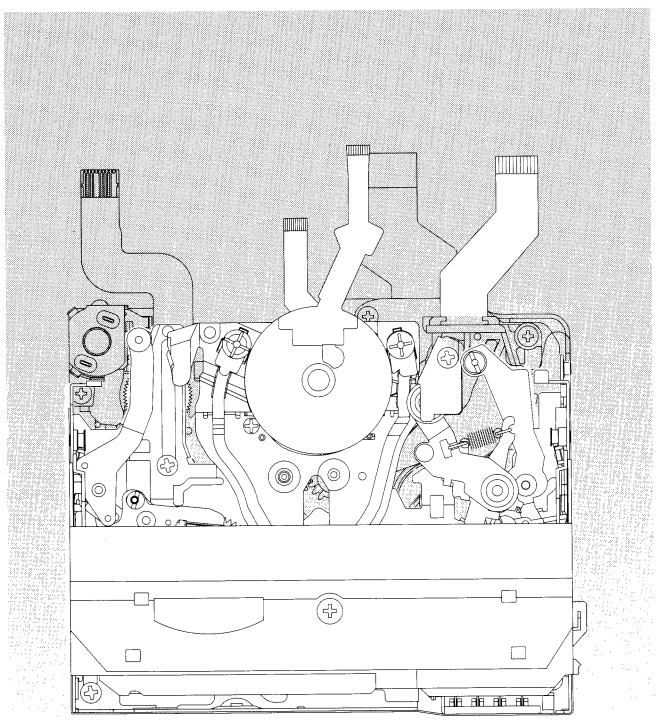
SAMSUNG

# DIGITAL COMCORDER DECK
# CSM-2000

# *MECHANICAL Manual*

◈ File with the SERVICE MANUAL.

DIGITAL CAMCORDER DECK



CONTENTS


1. Operation
2. Adjustment
3. Disassembly and Reassembly

# 1. Operation

## 1-1 Nomenclature

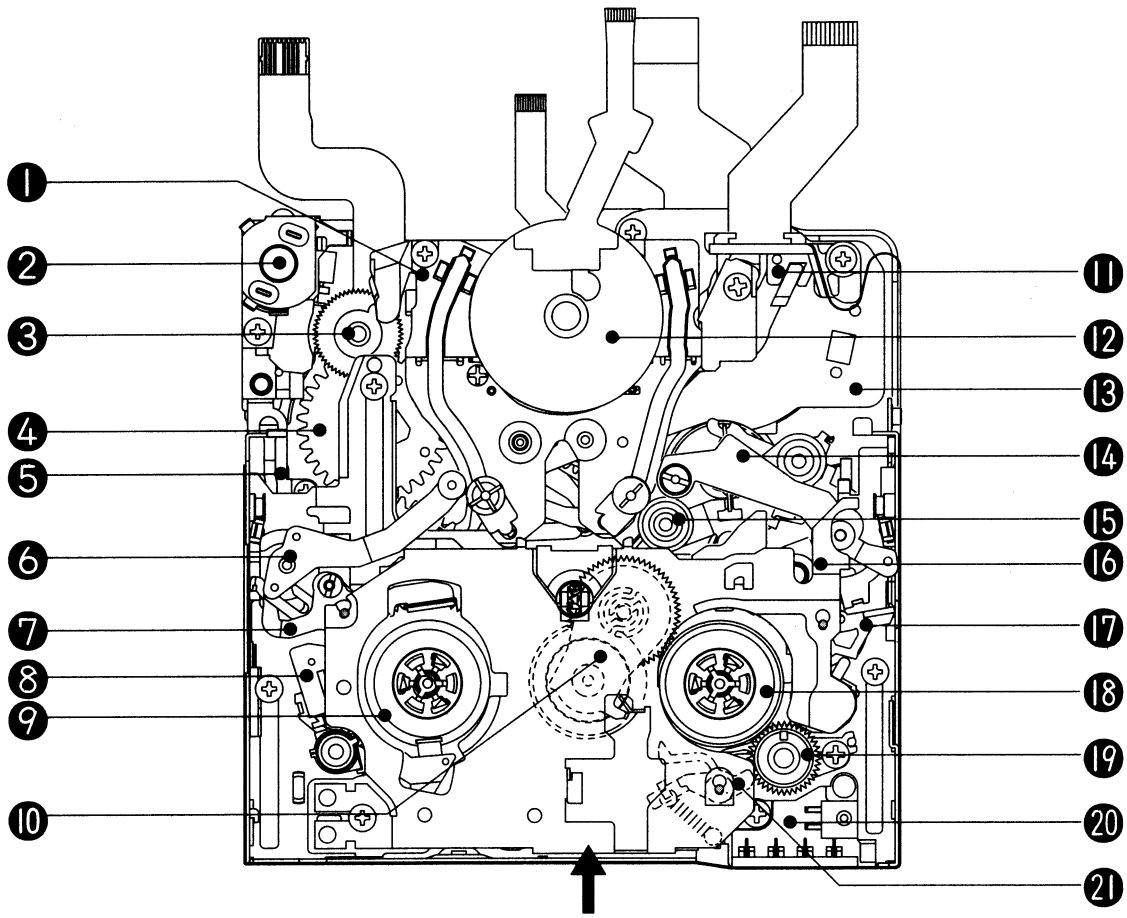



Fig 1-1

❶ BASE DRUM
❷ MOTOR LOADING
❸ GEAR WHEEL
❹ GEAR MODE SWITCH
❺ GUIDE TENSION CAM
❻ ARM TENSION
❼ BRAKE TENSION
❽ BRAKE S
❾ REEL DISK S
❿ IDLER
⓫ HOLDER FPC SUB
⓬ DRUM
⓭ MOTOR CAPSTAN
⓮ REVIEW ARM
⓯ ARM PINCH
⓰ COVER REEL
⓱ LEVER EJECT
⓲ REEL DISK T
⓳ BRAKE PULLY
⓴ SWITCH MIC
㉑ BRAKE MAIN T

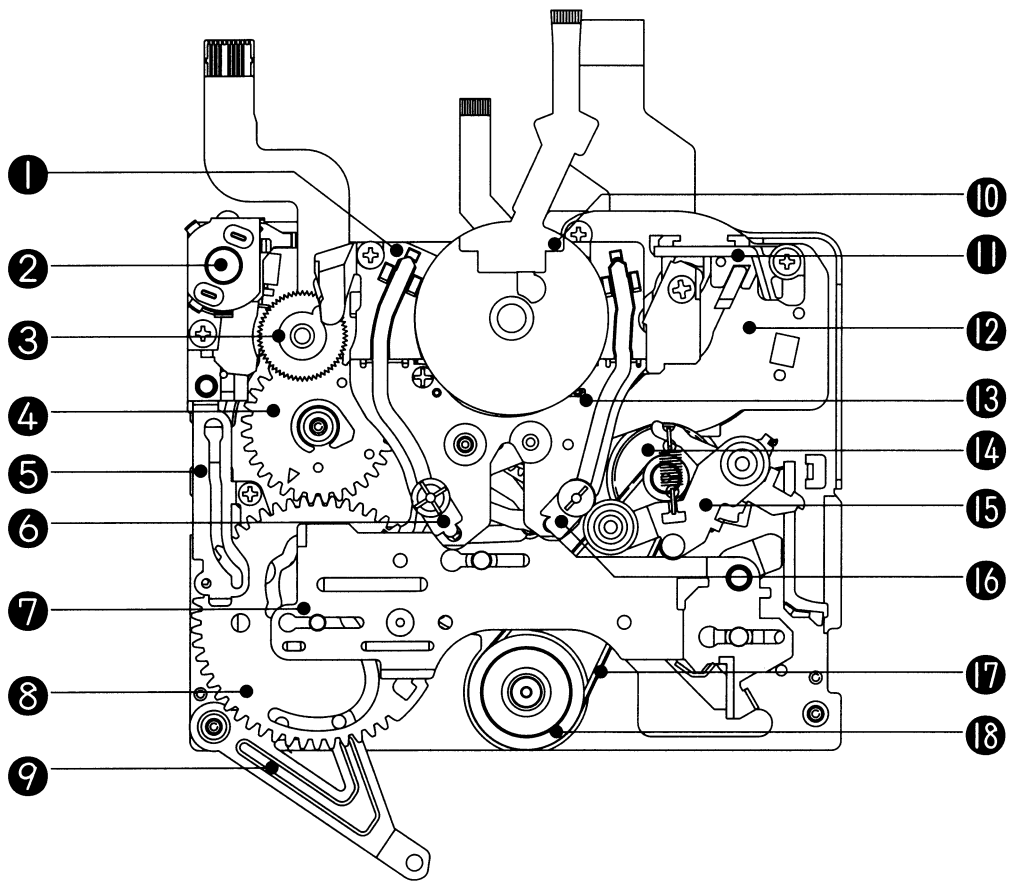



Fig 1-2

❶ BASE DRUM
❷ MOTOR LOADING
❸ GEAR WHEEL
❹ GEAR MODE SWITCH
❺ GUIDE TENSION CAM
❻ POLE BASE S
❼ SLIDE MAIN
❽ GEAR CAM MAIN
❾ LEVER CAM
❿ DRUM
⓫ HOLDER FPC SUB
⓬ MOTOR CAPSTAN
⓭ GUIDE RAIL
⓮ GEAR CAPSTAN
⓯ ARM PINCH
⓰ POLE BASE T
⓱ TIMMING BELT
⓲ GEAR PULLY

## 1-2 Switch Modes

Table 1-1 Switch Mode Code

| Modes | signal 2+common | Rotation Angle of Gear Mode | Mechanical state |
|---|---|---|---|
| EJECT | 18kΩ | -68.5° ~ -46.6° | Open housing |
| | | | |
| UNLOAD | 36 | -4° ~ 4° | Standby Cassette down |
| | | | |
| LD 1 | 54 | 51° ~ 59° | Idler Rotate and stop in loading mode |
| | | | |
| LD 2 | 72 | 70° ~ 140.8° | Capstan Rotate in unload mode |
| | | | |
| STOP | 90 | 199.89° ~ 207.85° | stop |
| | | | |
| PLAY | 0 | 269.3° ~ 288.5° | In REC/PB/CUE/FF/PAUSE |

※ Fig is based Eject Mode.

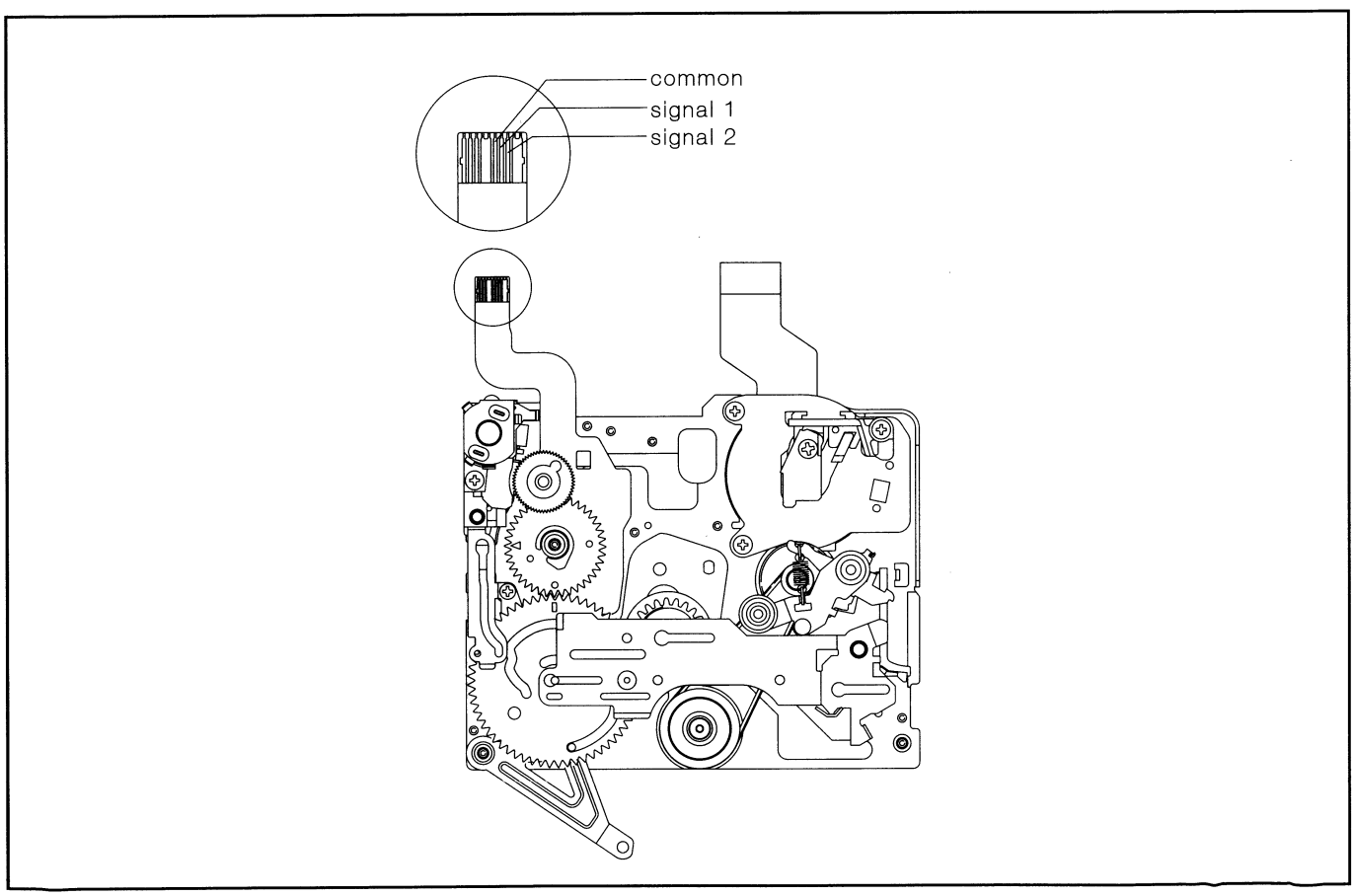



Fig 1-3

## 1-3-1 Gear Train

Moter Loading ❶ rotates
(Gear Worm Motor ❷ → Gear Worm Loading ❸)
↓
Gear Wheel ❹ rotates
↓
Gear Mode Switch ❺ rotates
↓
Gear Cam Main ❻ rotates

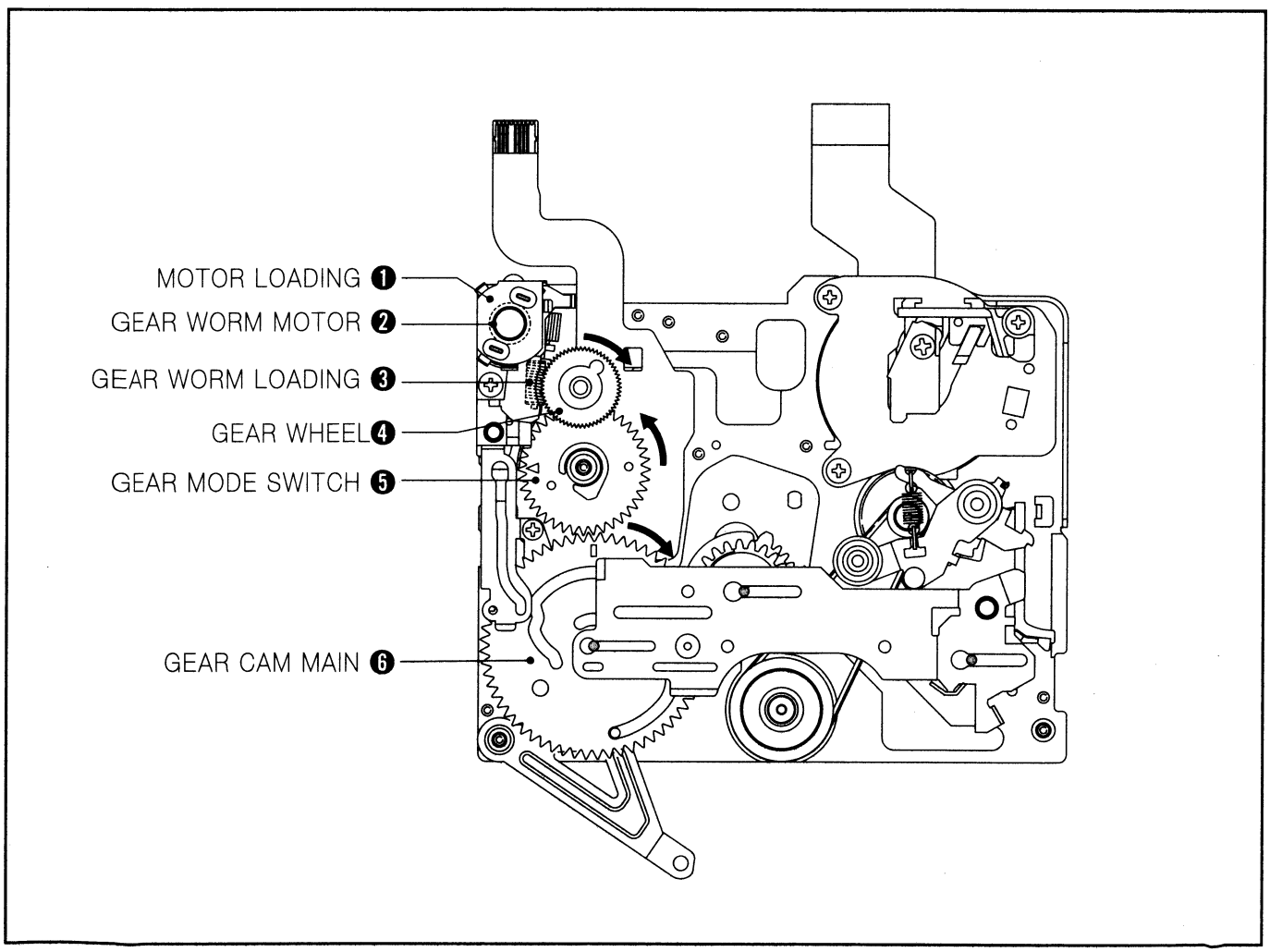



Fig 1-4

## 1-3-2 Chassis Sub

Motor Loading ❶ rotates.
↓
Gear Wheel ❷ rotates.
↓
Gear Mode Switch ❸ rotates.
↓
Gear Cam Main ❹ rotates.
↓
Lever Cam ❹ rotates.
↓
Chassis Sub ❻ moves.

| Mode | Chassis Sub |
|---|---|
| | OFF ON |
| EJECT | |
| | |
| UNLOAD | |
| | |
| LD 1 | |
| | |
| LD 2 | |
| | |
| STOP | |
| | |
| PLAY | |

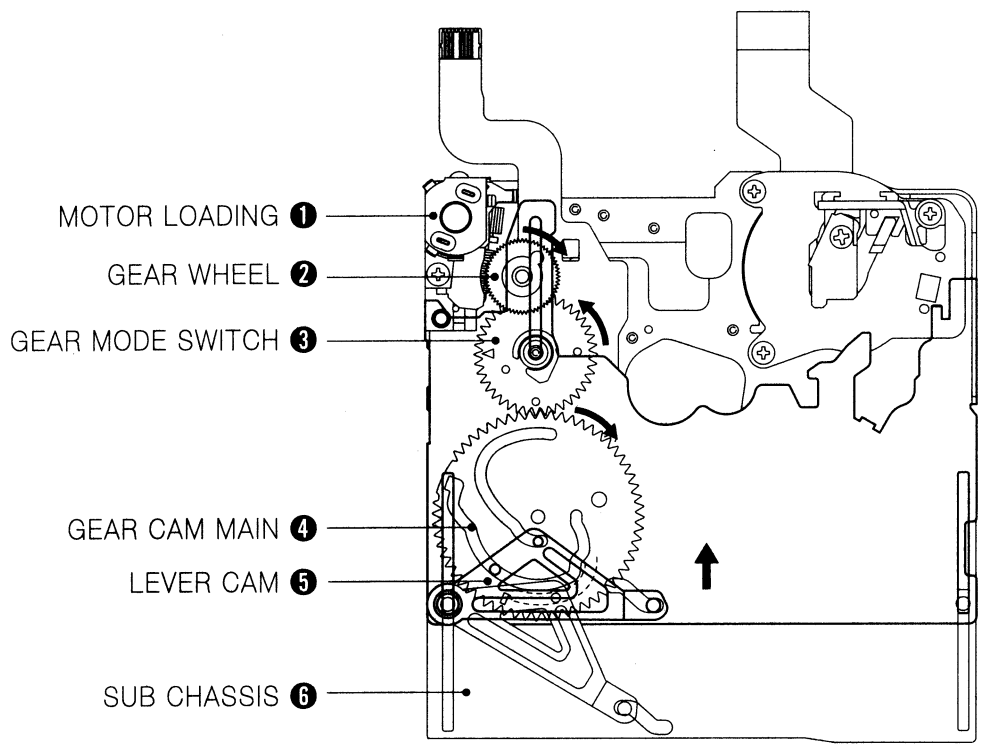



Fig 1-5

## 1-3-3 Brake S(SUB/MAIN)

Motor Loading ❶ rotates.
↓
Chassis Sub ❷ slides.
↓
Slide Main ❸ slides in direction of arrow.
↓
Brakes S ❹ released or operated to Reel Disk S ❺ by slide Main ❸.

| Mode | Sub Brake | | Main Brake | |
|---|---|---|---|---|
| EJECT | OFF | ON | OFF | ON |
| UNLOAD | | | | |
| LD 1 | | | | |
| LD 2 | | | | |
| STOP | | | | |
| PB | | | | |

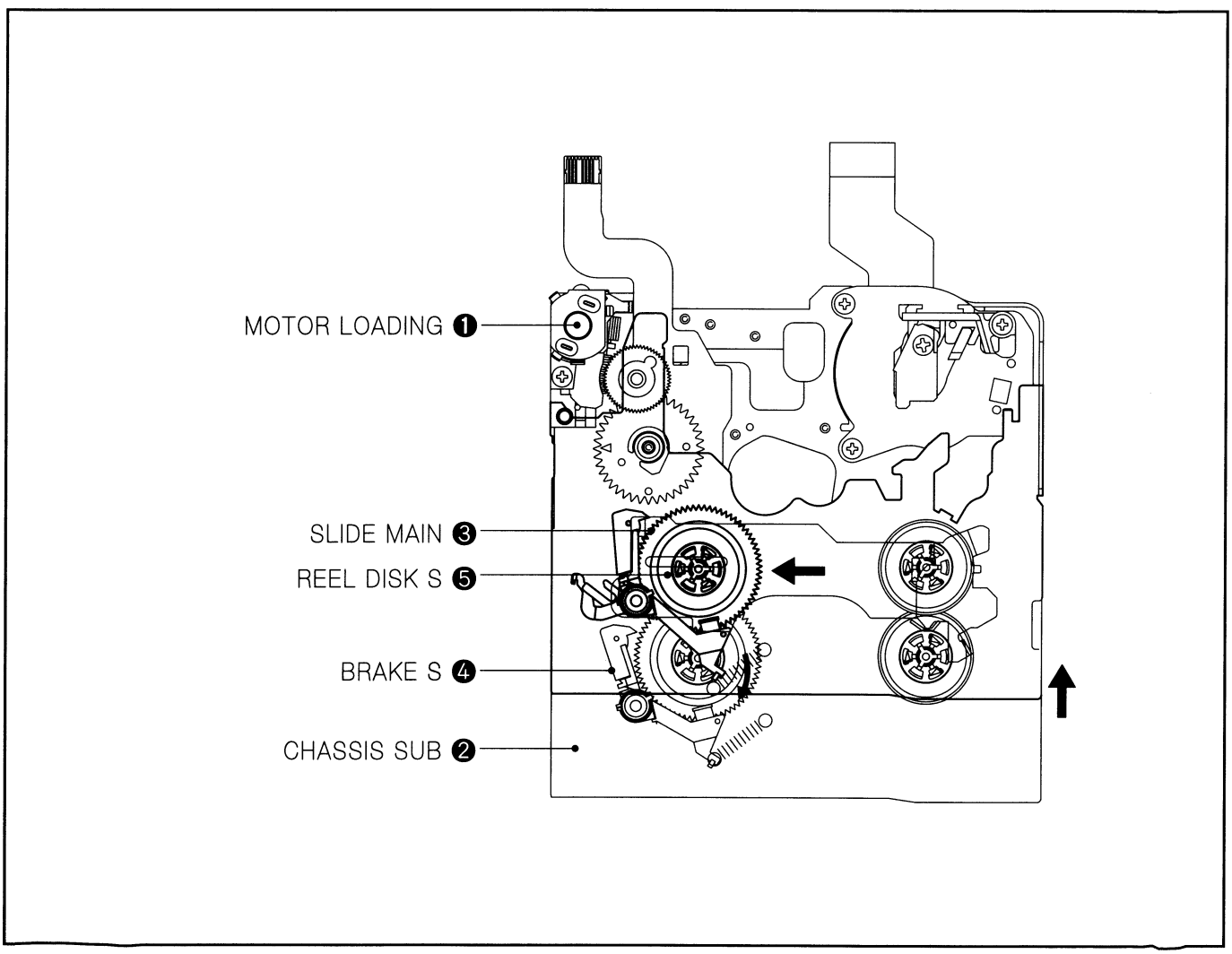



Fig 1-6

## 1-3-4 Brake T

Motor Loading ❶ rotates.
↓
Chassis Sub ❷ slides.
↓
Slide Main ❸ slides in direction of arrow.
↓
Brake T ❹ released or operated to Reel disk T ❺ by slide Main ❸

| Mode | Brake Main T | |
|---|---|---|
| | OFF | ON |
| EJECT | | |
| | | |
| UNLOAD | | |
| | | |
| LD 1 | | |
| | | |
| LD 2 | | |
| | | |
| STOP | | |
| | | |
| PB | | |

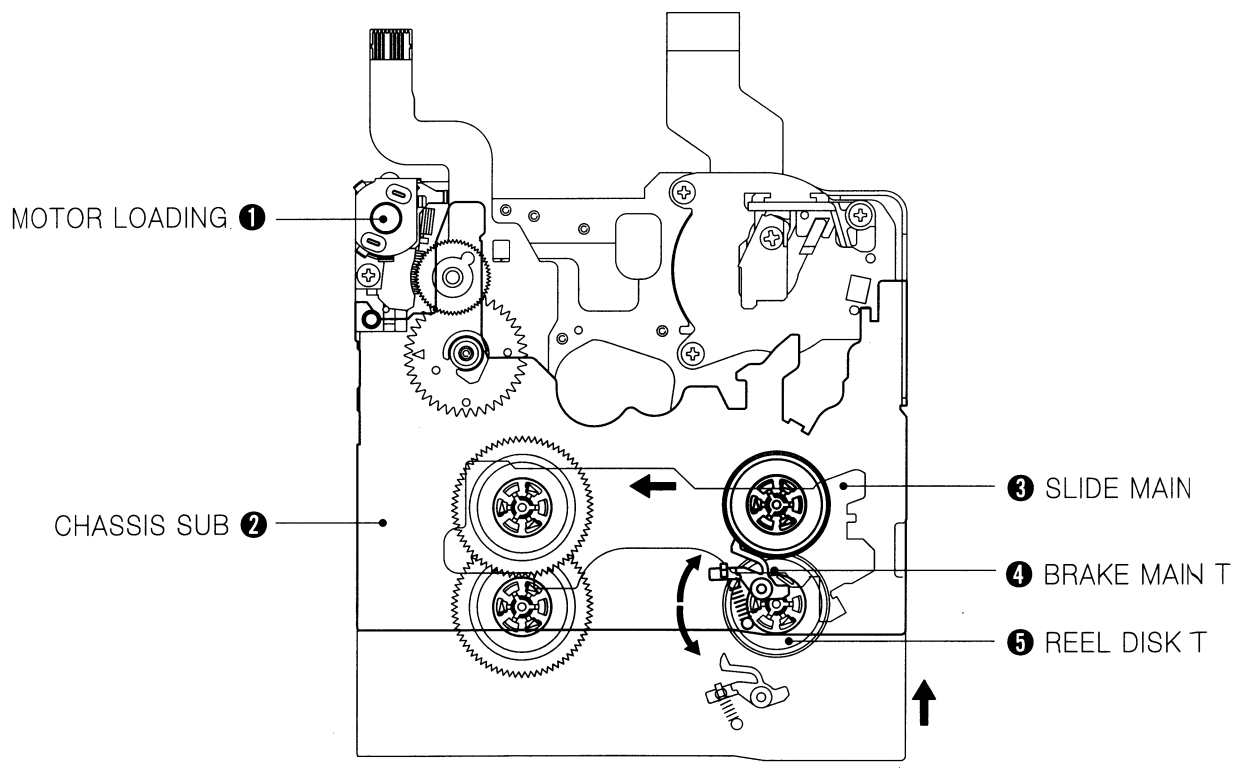



Fig 1-7

## 1-3-5 Arm Tension

Motor Loading ❶ rotates.
↓
Chassis Sub ❷ slides.
↓
Arm Tension ❻ slides in direction of arrow by Guide tension cam ❸ and cam curve A ❹
↓
Brake tension ❼ released or operated connection with Arm Tension.
↓
After Loading finished, Arm Tension ❻ is controled by cam curve ❾ of Gear Mode Switch ❽.

| Mode | Arm Tension |
|---|---|
| | OFF ON |
| EJECT | |
| | |
| UNLOAD | |
| | |
| LD 1 | |
| | |
| LD 2 | |
| | |
| STOP | |
| | |
| PLAY | |

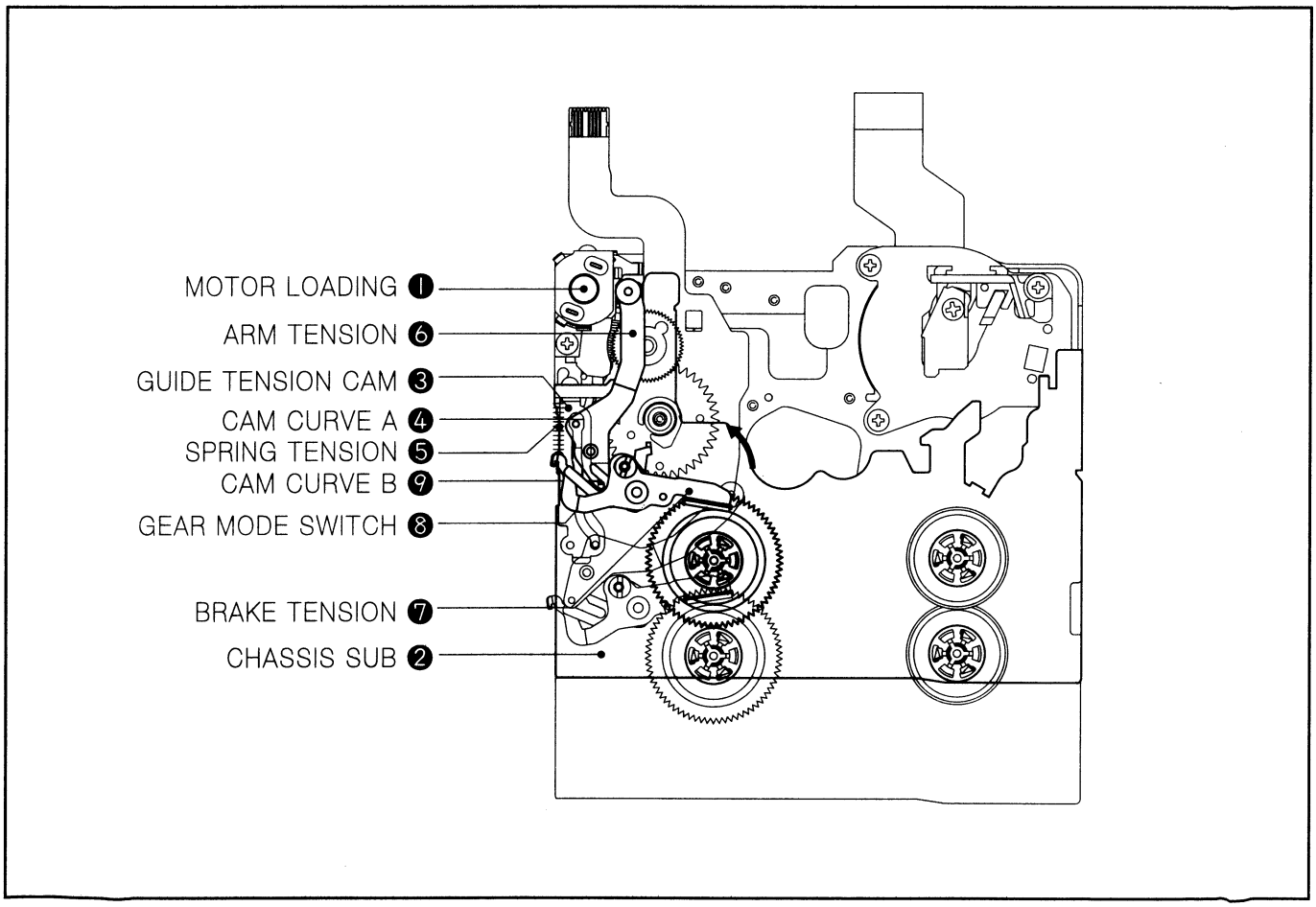



Fig 1-8

## 1-3-6 Arm Pinch

| Mode | Arm Pinch |
|---|---|
| | OFF ON |
| EJECT | |
| | |
| UNLOAD | |
| | |
| LD 1 | |
| | |
| LD 2 | |
| | |
| STOP | |
| | |
| PLAY | |

Motor Loading ❶ rotates.

↓

Chassis Sub ❷ moves.

↓

Arm Pinch ❹ rotates cam curve A ❸ of Chassis Sub ❷.

↓

After Chassis Sub ❷ is finished loading, slider main ❺ slides in direction of arrow.

↓

Pinch Roller ❻ contacts shaft of Motor capstan ❼.

↓

Motor loading ❶ rotates in reverse.

↓

Slide main ❺ moves in reverse direction of arrow.

↓

Pinch Roller ❻ released from shaft of Motor Capstan ❼ by spring force of spring Lever pinch ❽.

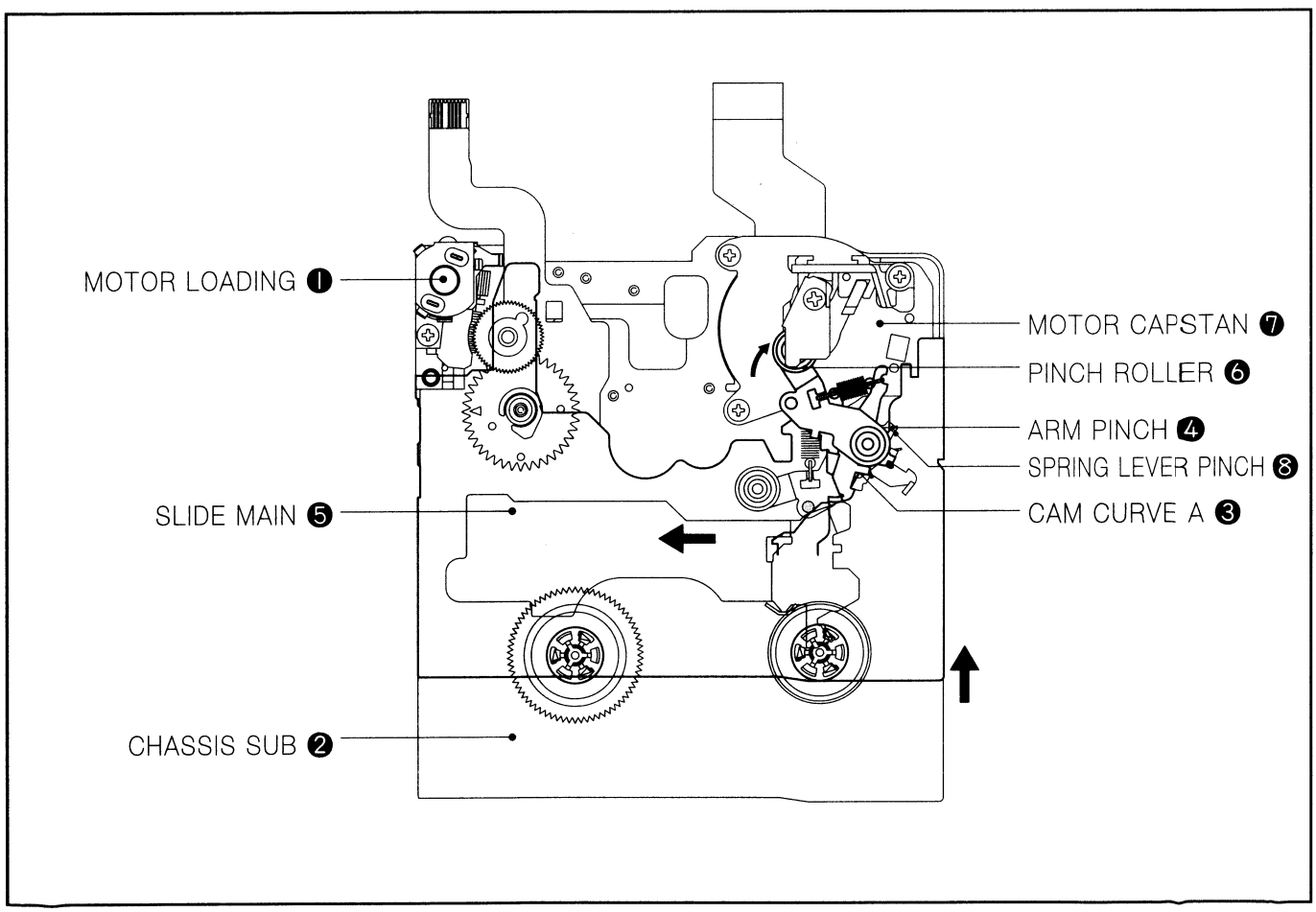



Fig 1-9

## 1-3-7 Arm Review

Motor Loading ❶ rotates.

↓

Chassis Sub ❷ moves.

↓

Arm Review ❺ simultaneously rotates clockwise and translates via cam curve ❹ of Chassis Main ❸

| Mode | Arm Review |
|---|---|
| | OFF ON |
| EJECT | |
| | |
| UNLOAD | |
| | |
| LD 1 | |
| | |
| LD 2 | |
| | |
| STOP | |
| | |
| PLAY | |

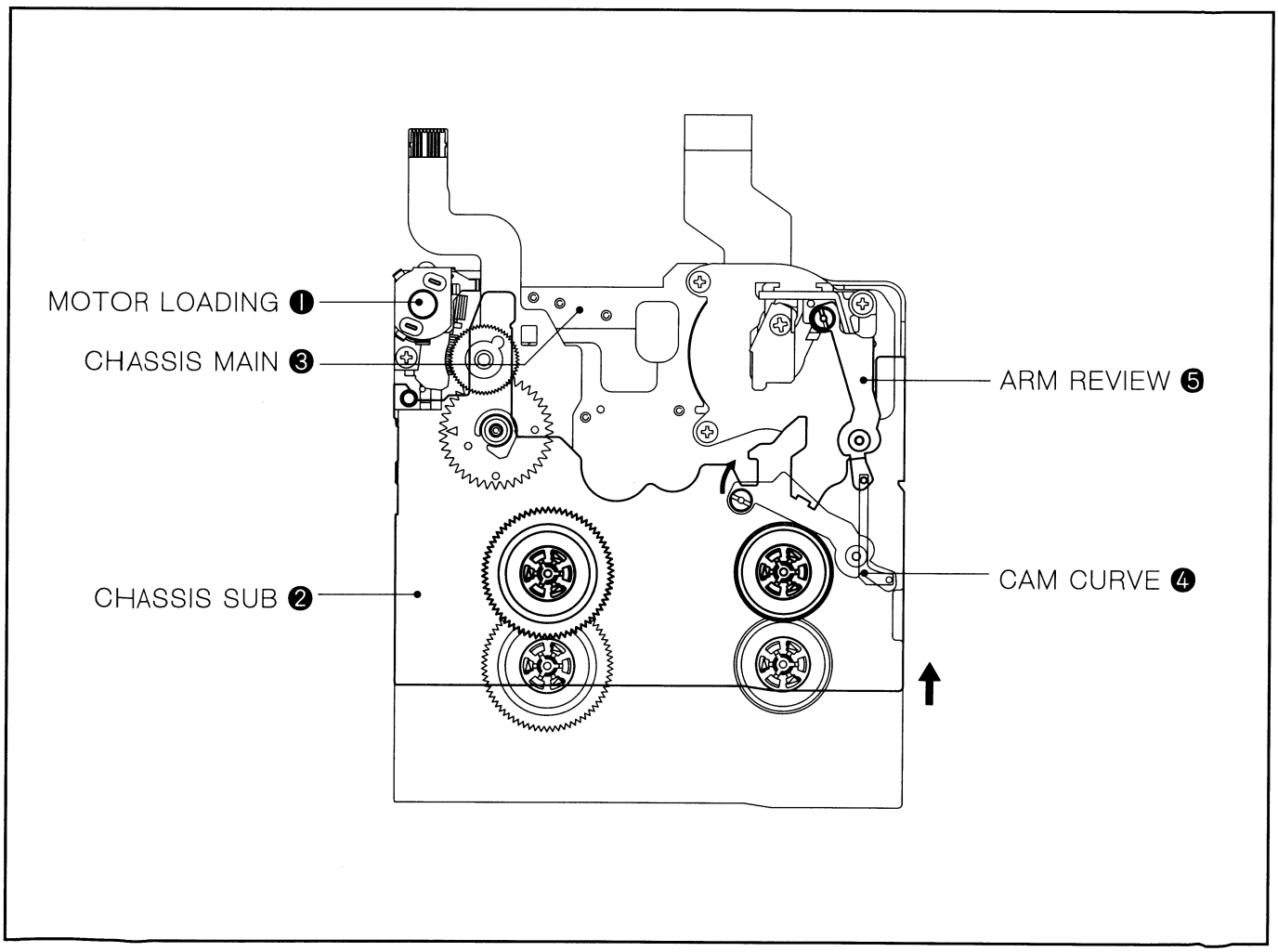



Fig 1-10

## 1-3-8 Pole Base S, T

Motor Loading ❶ rotates.
↓
Gear Wheel ❷ rotates.
↓
Gear Mode Switch ❸ rotates.
↓
Gear Cam Main ❹ rotates.
↓
Gear connector ❺ rotates.
↓
Arm Loading S and T are actuated by Gear Loading S ❻ and T ❼.
↓
Pole Base S ❽ and T ❾ slide along S and T rails.
↓
Pole Base S ❽ and T ❾ attach to V home of Base Drum ⓫.

| Mode | Pole Base S, T |
|---|---|
| | OFF ON |
| EJECT | |
| | |
| UNLOAD | |
| | |
| LD 1 | |
| | |
| LD 2 | |
| | |
| STOP | |
| | |
| PLAY | |

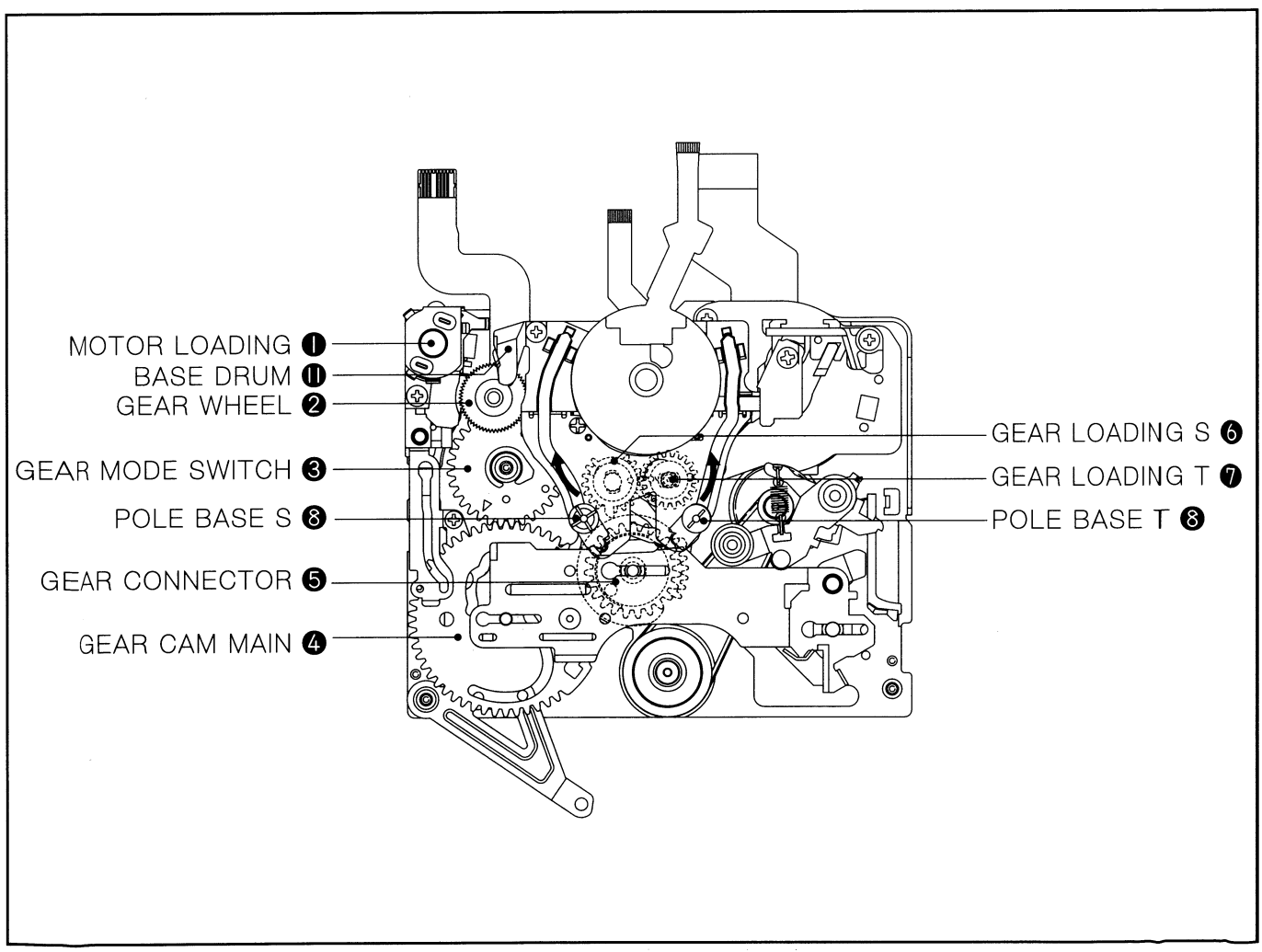



Fig 1-11

## 1-3-9 Reel Driving

Motor Capstan ❶ rotates.
↓
Gear Capstan ❷ rotates.
↓
Belt timming ❸ transmits rotation to Gear pully ❹.
↓
Gear Idler ❺ engages Reel Disk T ❻ or Reel Disk S ❻.
↓
Reel Disk T ❻ or Reel Disk S ❼ rotates.

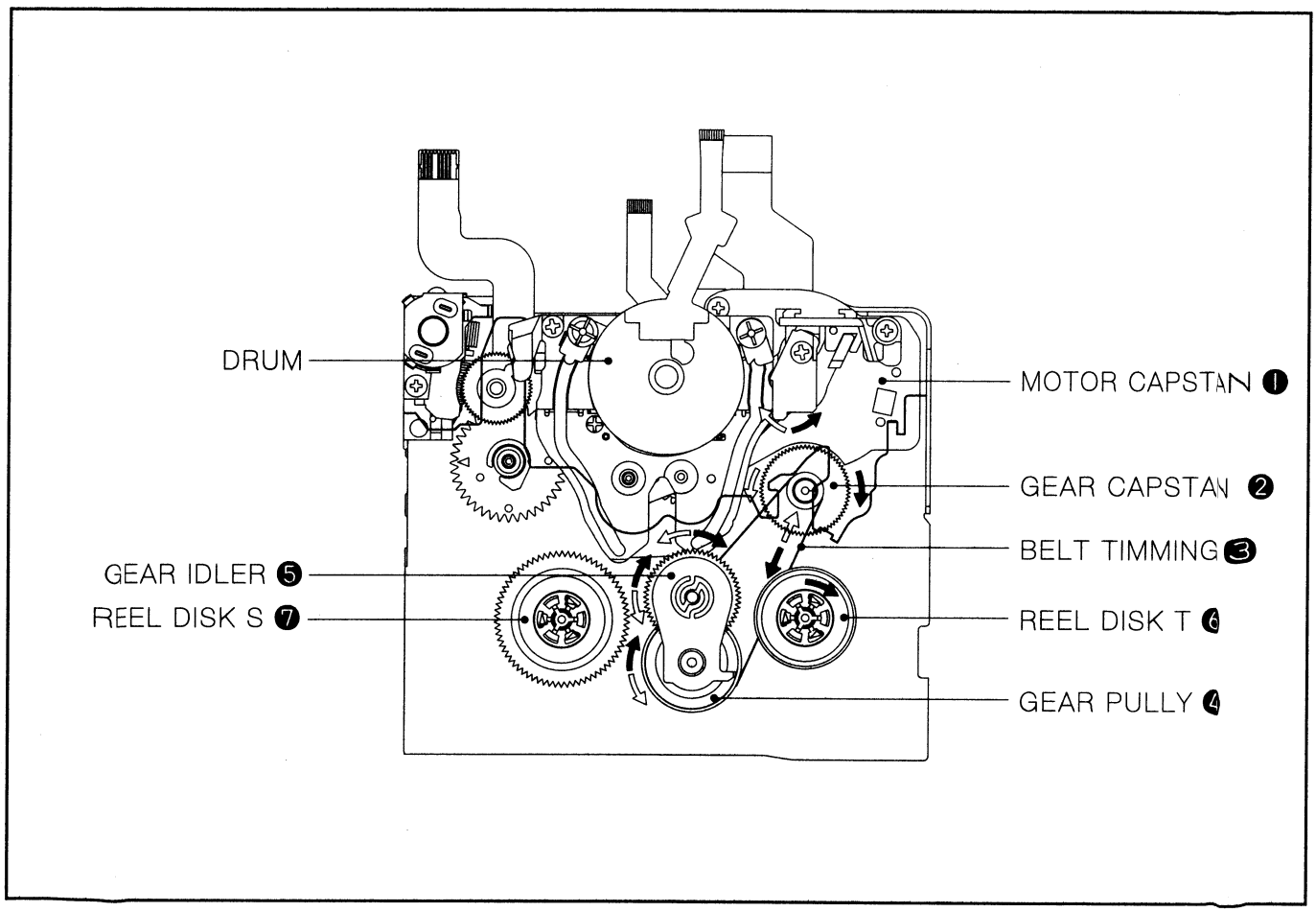
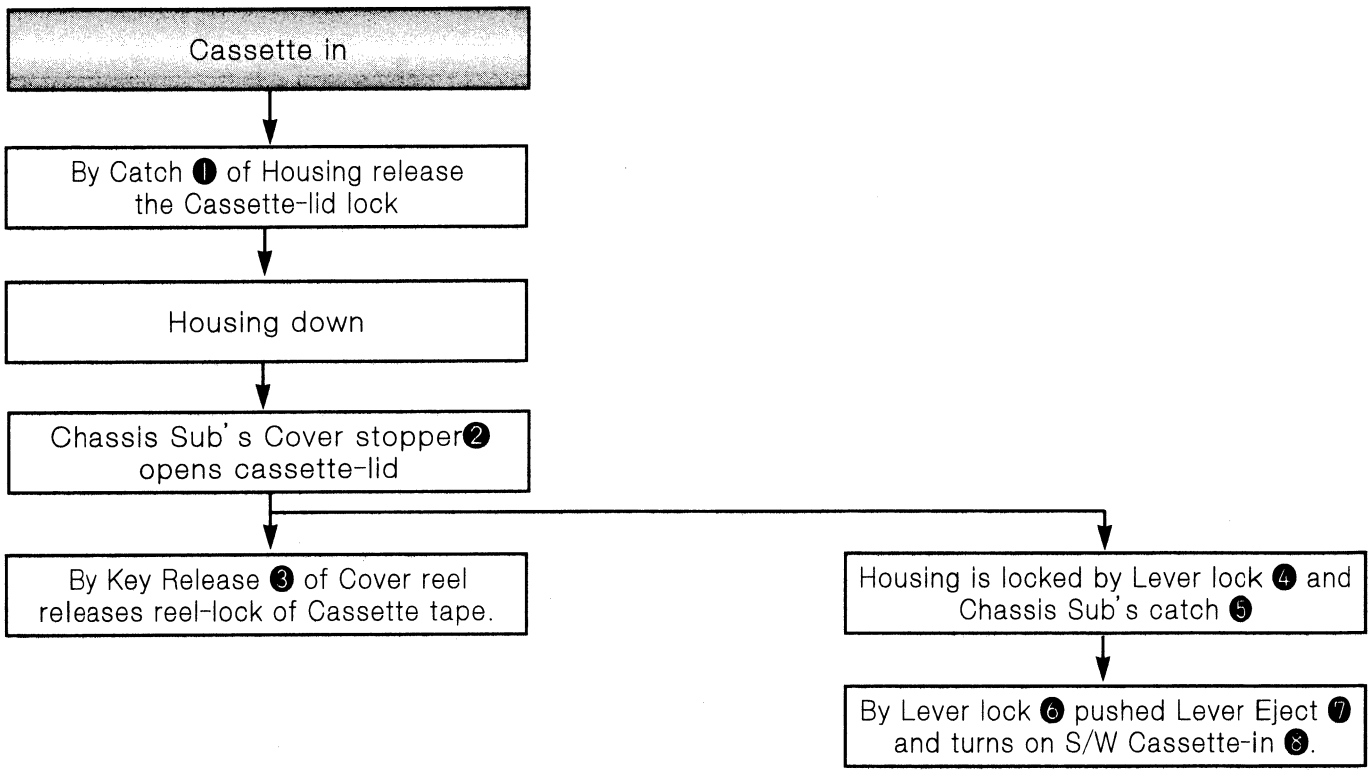



Fig 1-12

# 1-4 Mode Transitions

## 1-4-1 Cassette in → Cassette down


Cassette in
By Catch ❶ of Housing release the Cassette-lid lock
Housing down
Chassis Sub's Cover stopper❷ opens cassette-lid
By Key Release ❸ of Cover reel releases reel-lock of Cassette tape.
Housing is locked by Lever lock ❹ and Chassis Sub's catch ❺
By Lever lock ❻ pushed Lever Eject ❼ and turns on S/W Cassette-in ❽.

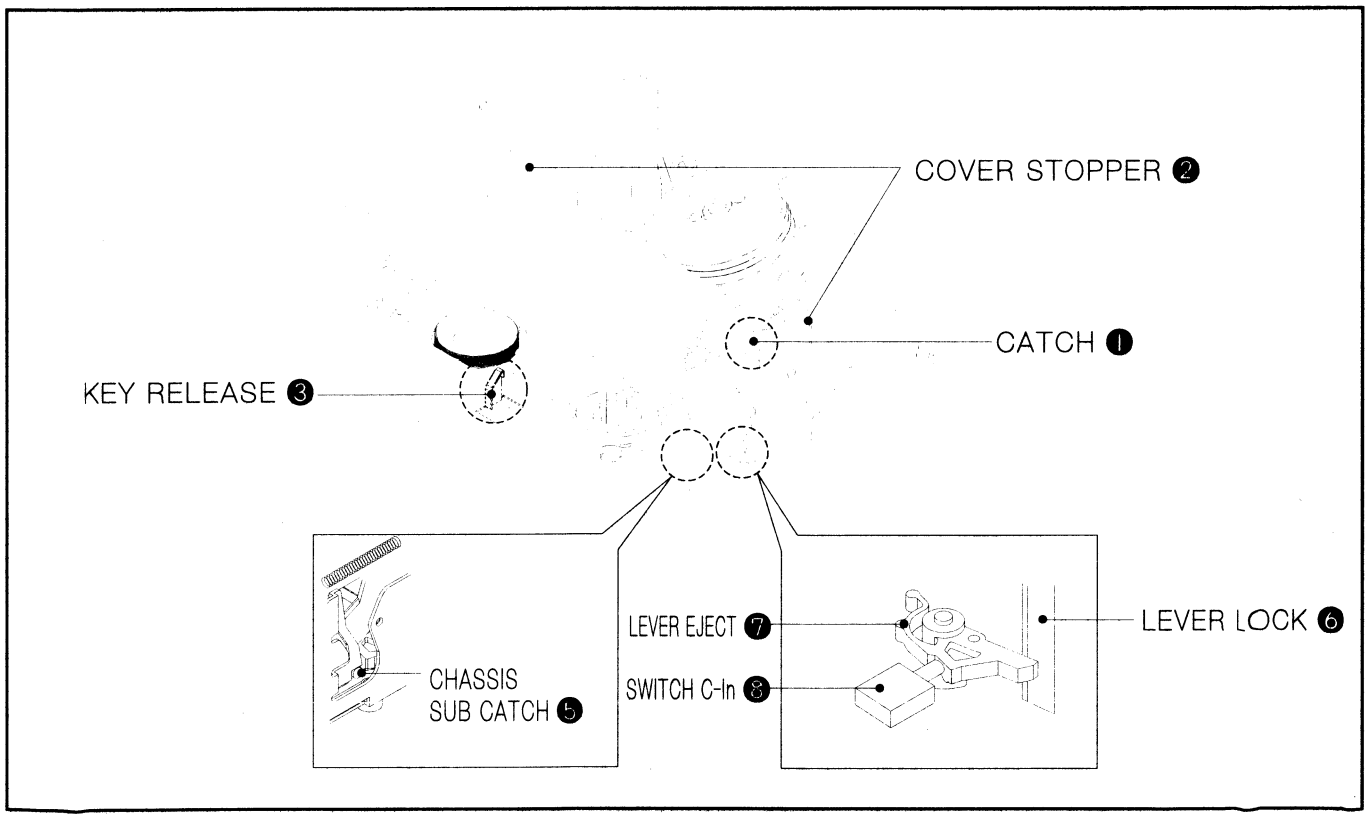
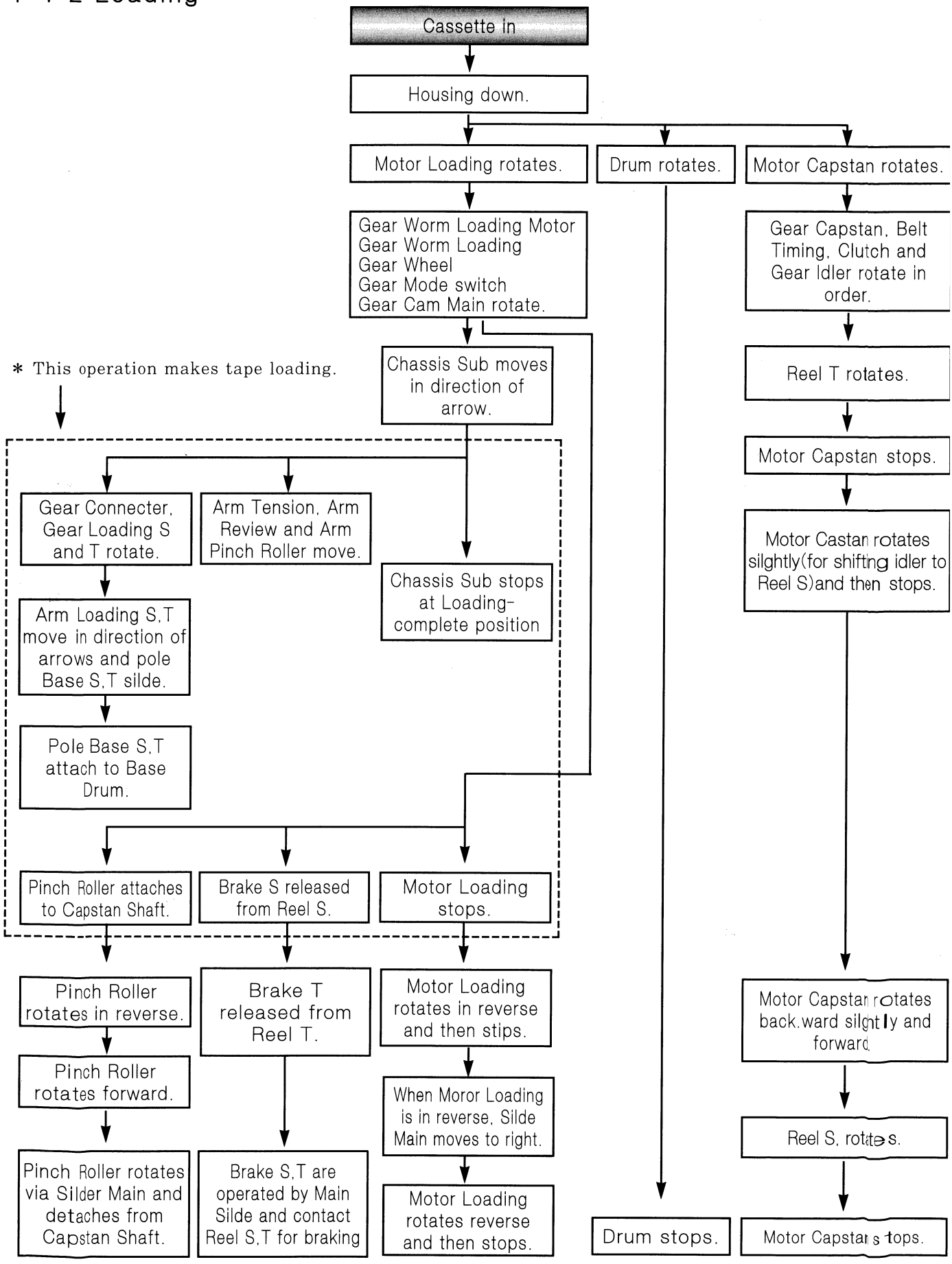



FIG 1-13

## 1-4-2 Loading


Cassette in
Housing down.
Motor Loading rotates.
Drum rotates.
Motor Capstan rotates.
Gear Worm Loading Motor
Gear Worm Loading
Gear Wheel
Gear Mode switch
Gear Cam Main rotate.
Gear Capstan, Belt Timing, Clutch and Gear Idler rotate in order.
* This operation makes tape loading.
Chassis Sub moves in direction of arrow.
Reel T rotates.
Motor Capstan stops.
Gear Connecter, Gear Loading S and T rotate.
Arm Tension, Arm Review and Arm Pinch Roller move.
Chassis Sub stops at Loading-complete position
Motor Castan rotates silghtly(for shifting idler to Reel S)and then stops.
Arm Loading S,T move in direction of arrows and pole Base S,T silde.
Pole Base S,T attach to Base Drum.
Pinch Roller attaches to Capstan Shaft.
Brake S released from Reel S.
Motor Loading stops.
Pinch Roller rotates in reverse.
Brake T released from Reel T.
Motor Loading rotates in reverse and then stips.
Motor Capstan rotates back.ward silghtly and forward.
Pinch Roller rotates forward.
When Moror Loading is in reverse, Silde Main moves to right.
Reel S, rotates.
Pinch Roller rotates via Silder Main and detaches from Capstan Shaft.
Brake S,T are operated by Main Silde and contact Reel S,T for braking
Motor Loading rotates reverse and then stops.
Drum stops.
Motor Capstan stops.

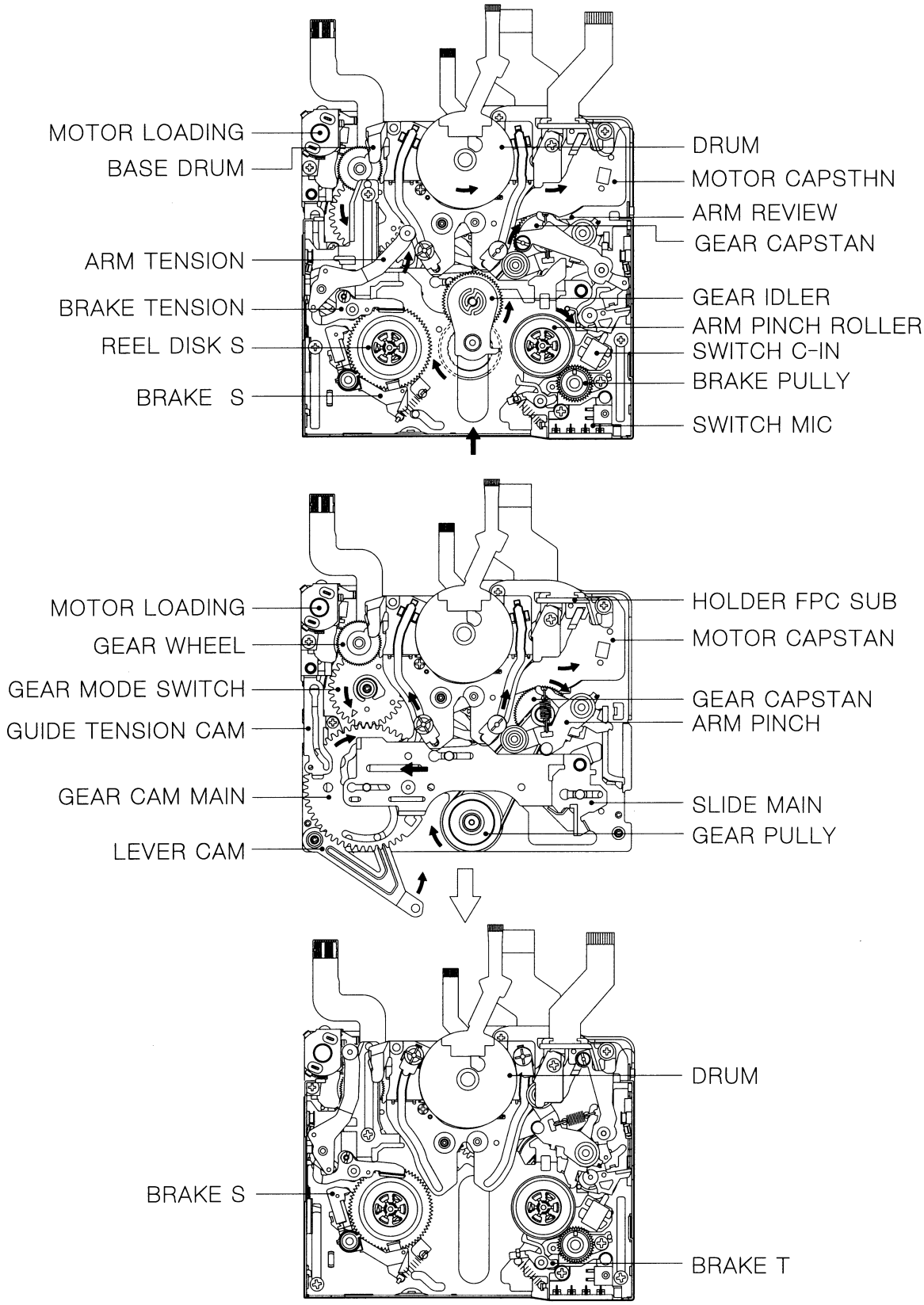
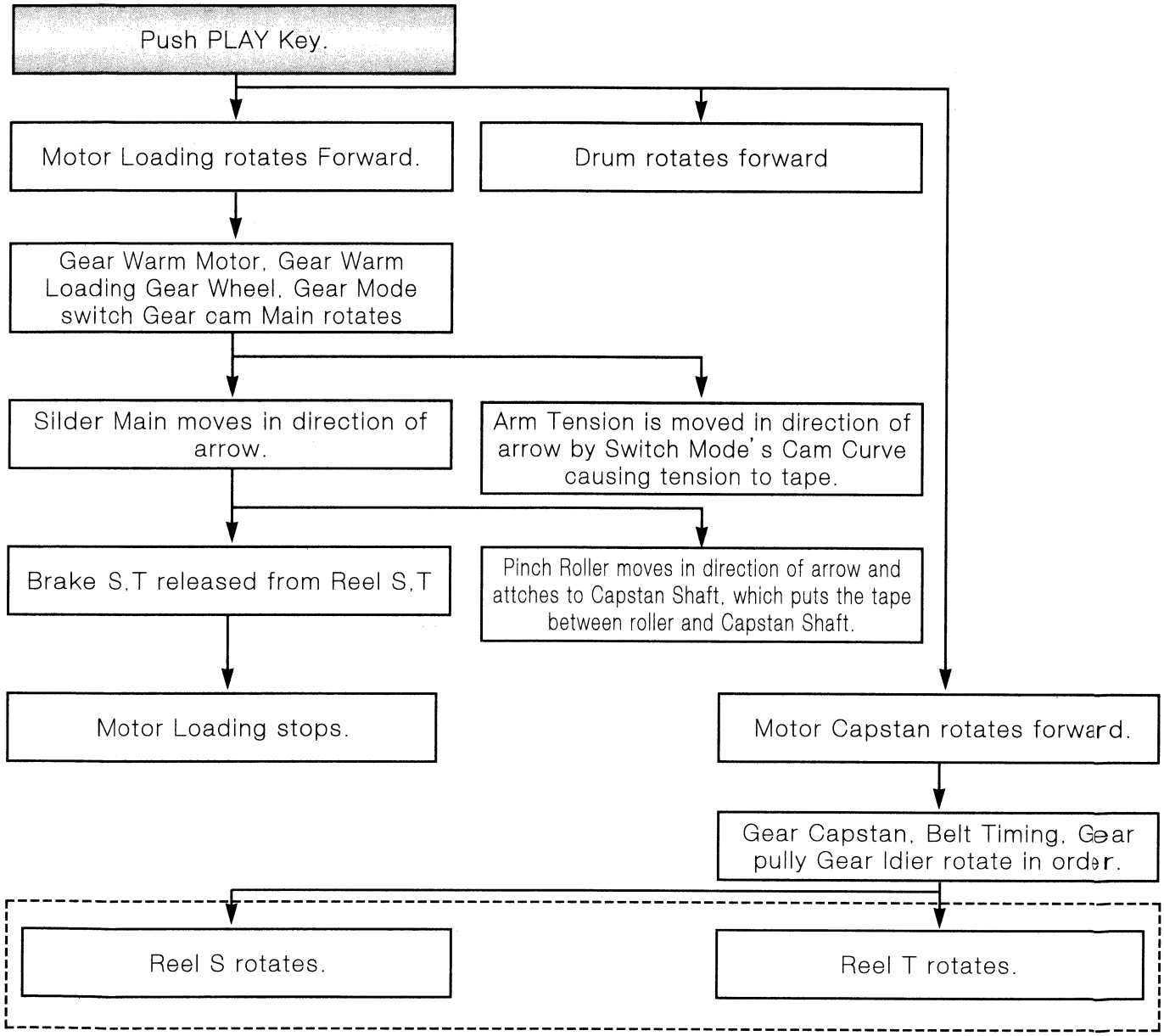

MOTOR LOADING
BASE DRUM
ARM TENSION
BRAKE TENSION
REEL DISK S
BRAKE S
DRUM
MOTOR CAPSTHN
ARM REVIEW
GEAR CAPSTAN
GEAR IDLER
ARM PINCH ROLLER
SWITCH C-IN
BRAKE PULLY
SWITCH MIC
MOTOR LOADING
GEAR WHEEL
GEAR MODE SWITCH
GUIDE TENSION CAM
GEAR CAM MAIN
LEVER CAM
HOLDER FPC SUB
MOTOR CAPSTAN
GEAR CAPSTAN
ARM PINCH
SLIDE MAIN
GEAR PULLY
BRAKE S
DRUM
BRAKE T

Fig 1-14

## 1-4-3 Stop → Play


Push PLAY Key.
Motor Loading rotates Forward.
Drum rotates forward
Gear Warm Motor, Gear Warm Loading Gear Wheel, Gear Mode switch Gear cam Main rotates
Silder Main moves in direction of arrow.
Arm Tension is moved in direction of arrow by Switch Mode's Cam Curve causing tension to tape.
Brake S,T released from Reel S,T
Pinch Roller moves in direction of arrow and attches to Capstan Shaft, which puts the tape between roller and Capstan Shaft.
Motor Loading stops.
Motor Capstan rotates forward.
Gear Capstan, Belt Timing, Gear pully Gear Idier rotate in order.
Reel S rotates.
Reel T rotates.

* Tape is fed by the winding operation of Motor Capstan.

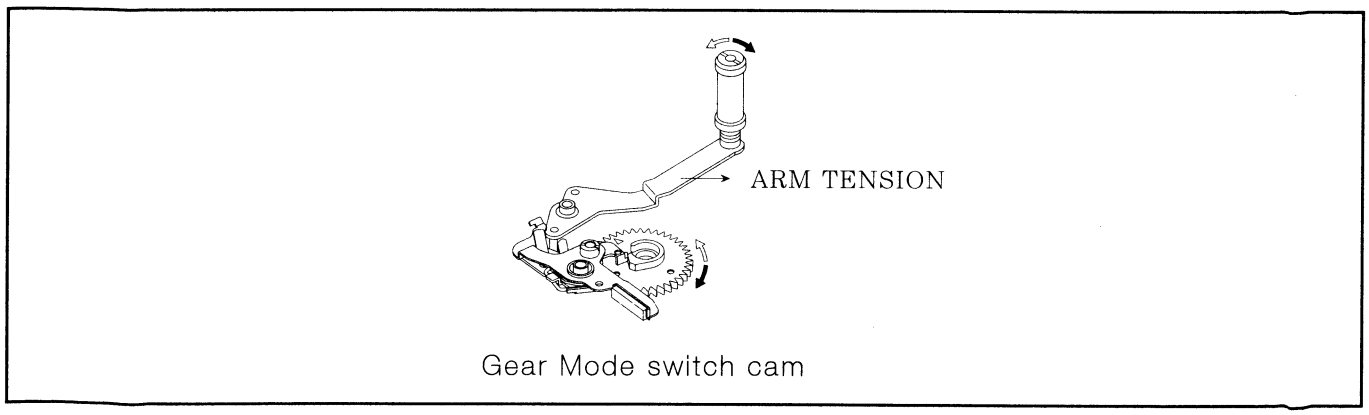



Fig 1-15

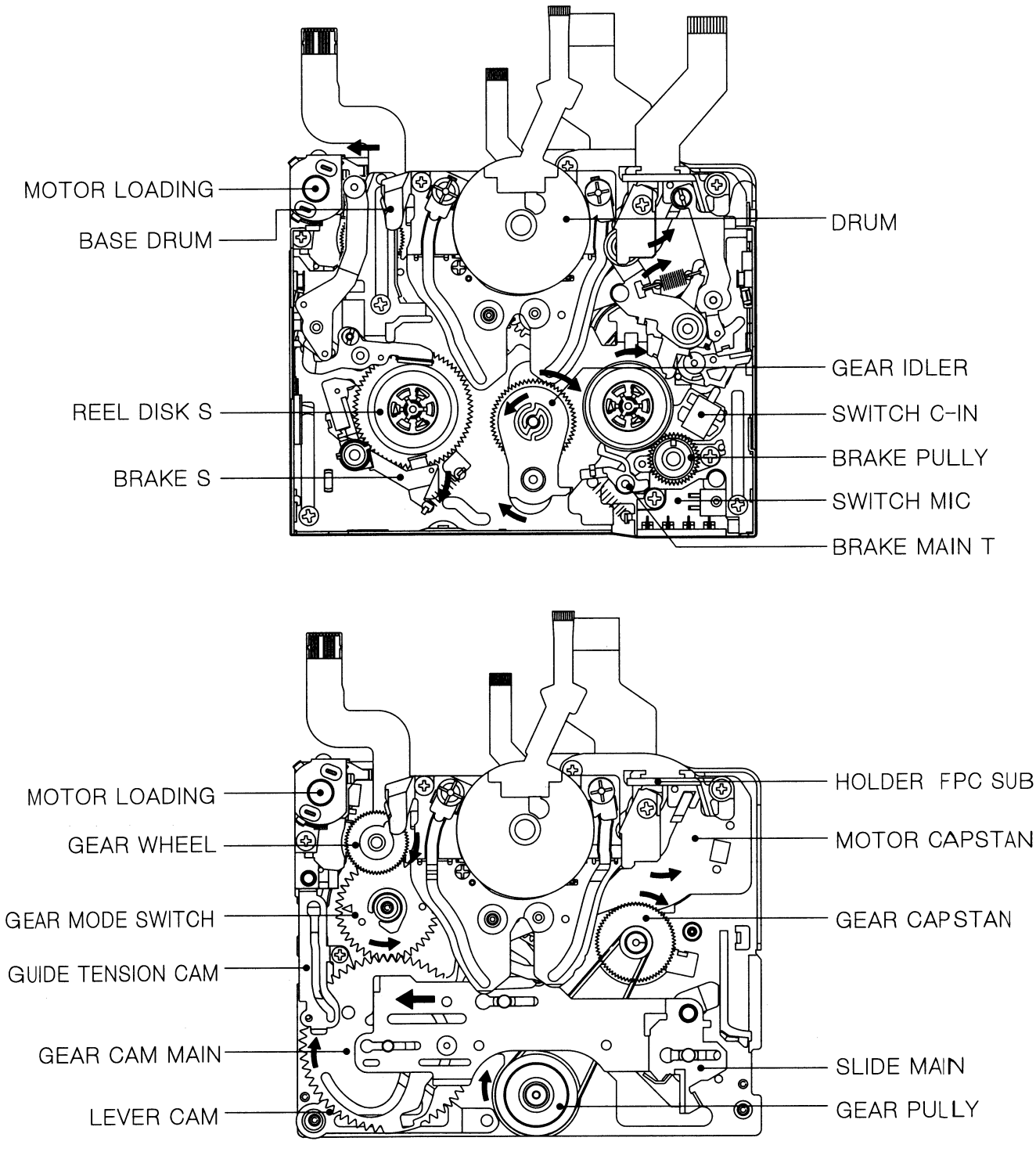
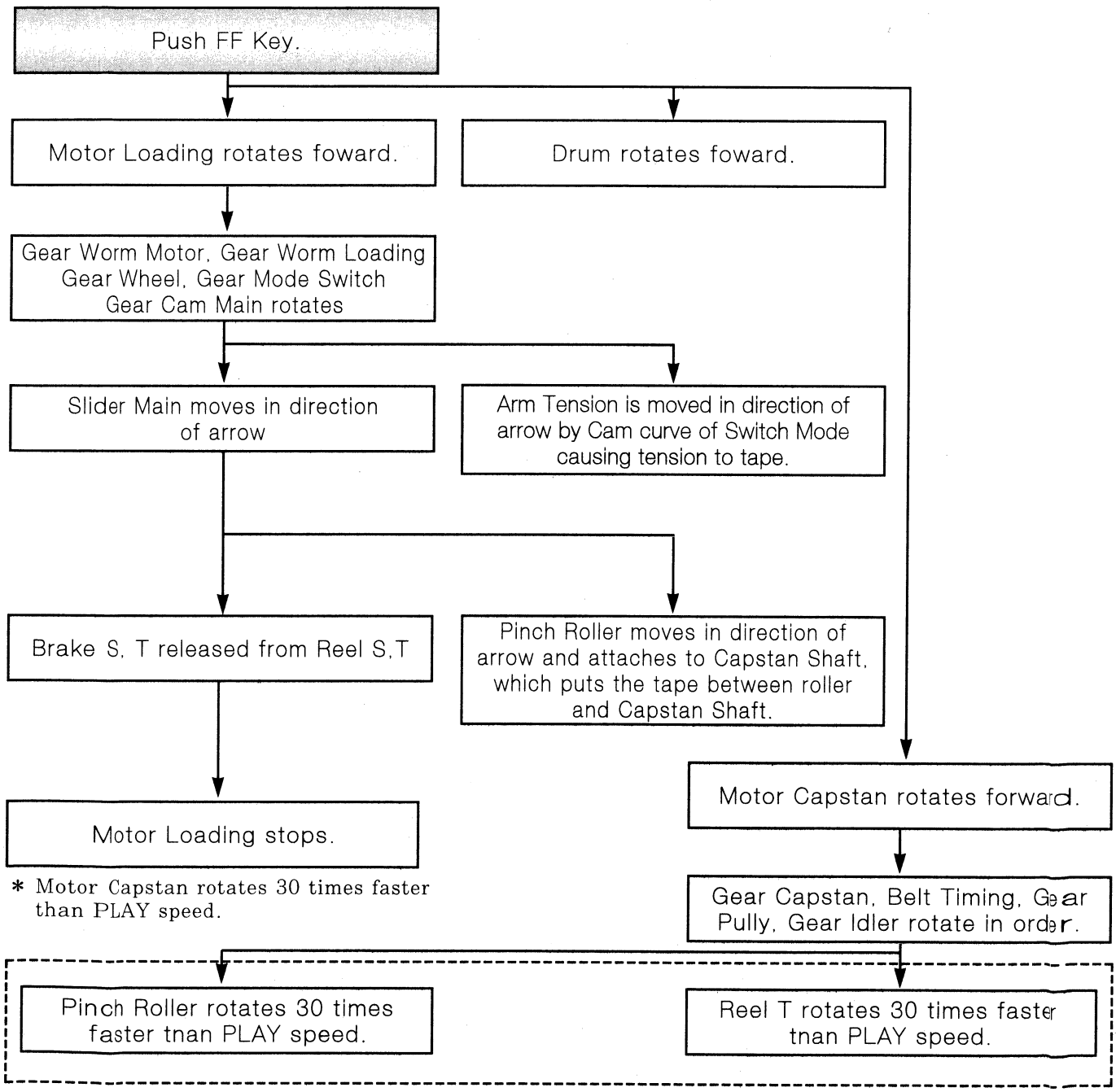

MOTOR LOADING
BASE DRUM
REEL DISK S
BRAKE S
DRUM
GEAR IDLER
SWITCH C-IN
BRAKE PULLY
SWITCH MIC
BRAKE MAIN T
MOTOR LOADING
GEAR WHEEL
GEAR MODE SWITCH
GUIDE TENSION CAM
GEAR CAM MAIN
LEVER CAM
HOLDER FPC SUB
MOTOR CAPSTAN
GEAR CAPSTAN
SLIDE MAIN
GEAR PULLY

fig 1-16

## 1-4-4 Stop → FF


Push FF Key.
Motor Loading rotates foward.
Drum rotates foward.
Gear Worm Motor, Gear Worm Loading Gear Wheel, Gear Mode Switch Gear Cam Main rotates
Slider Main moves in direction of arrow
Arm Tension is moved in direction of arrow by Cam curve of Switch Mode causing tension to tape.
Brake S, T released from Reel S,T
Pinch Roller moves in direction of arrow and attaches to Capstan Shaft, which puts the tape between roller and Capstan Shaft.
Motor Capstan rotates forward.
Motor Loading stops.
* Motor Capstan rotates 30 times faster than PLAY speed.
Gear Capstan, Belt Timing, Gear Pully, Gear Idler rotate in order.
Pinch Roller rotates 30 times faster tnan PLAY speed.
Reel T rotates 30 times faster tnan PLAY speed.

* This operation feeds tape 30 times faster than PLAY speed.

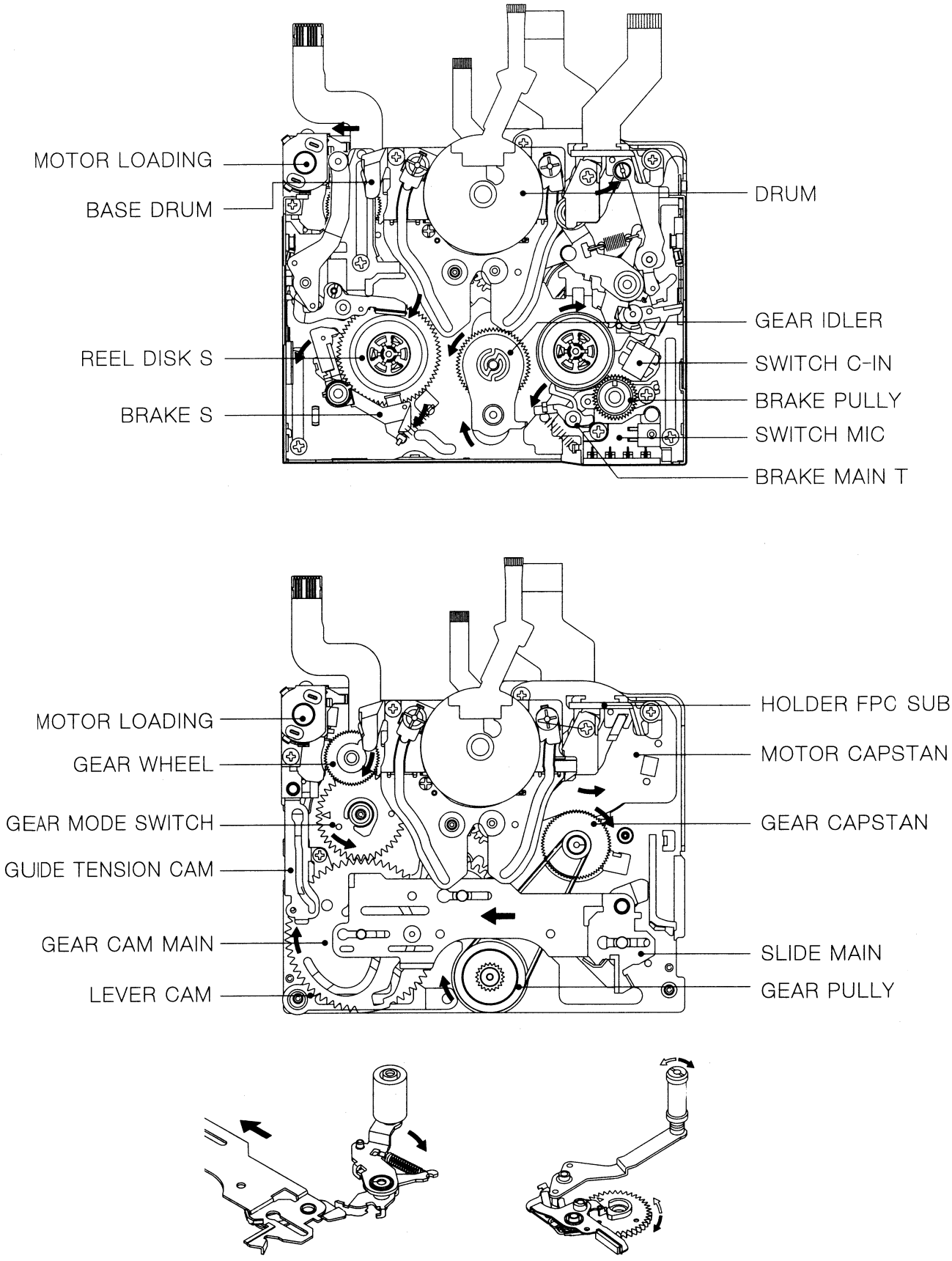
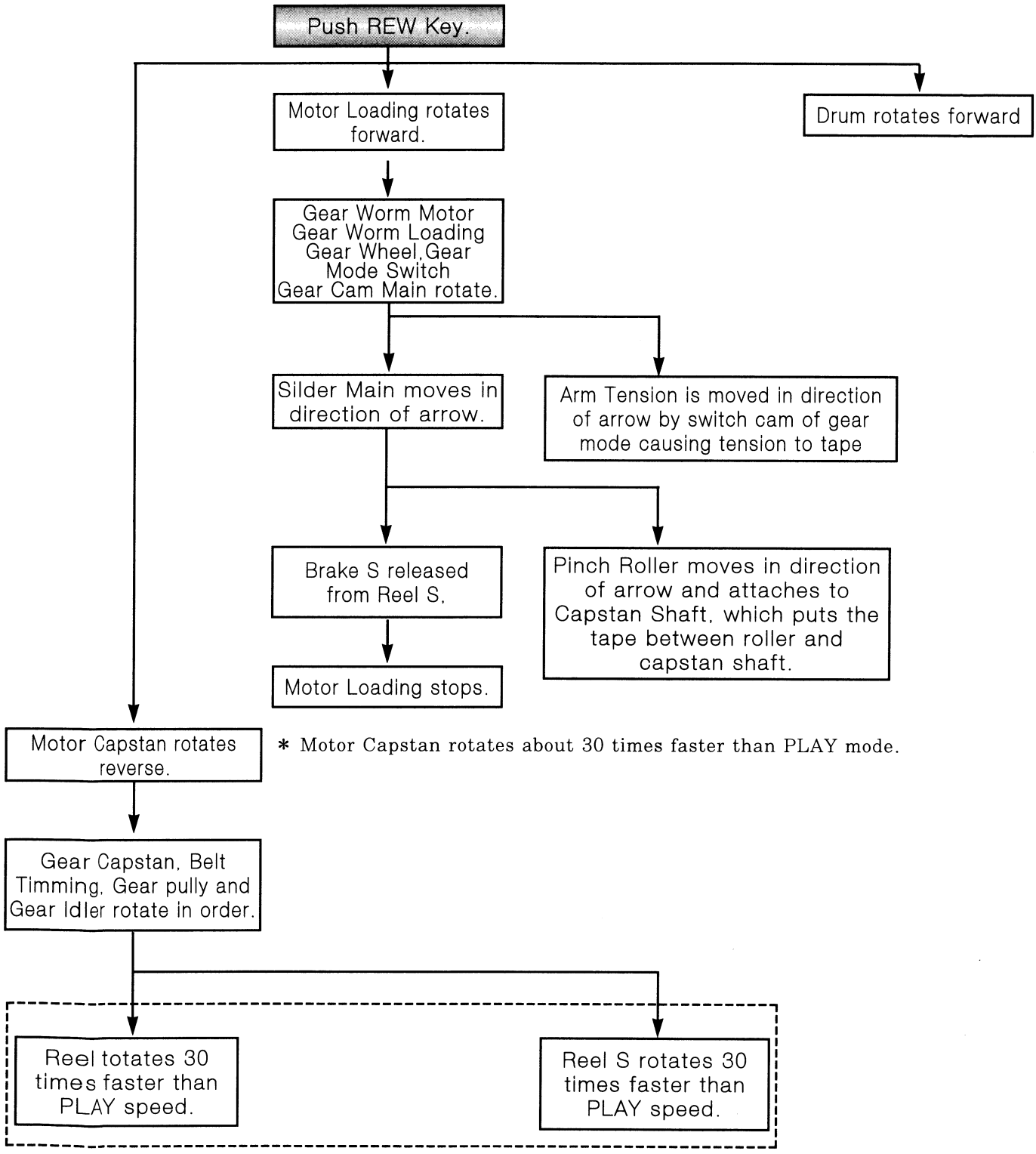

MOTOR LOADING
BASE DRUM
REEL DISK S
BRAKE S
DRUM
GEAR IDLER
SWITCH C-IN
BRAKE PULLY
SWITCH MIC
BRAKE MAIN T
MOTOR LOADING
GEAR WHEEL
GEAR MODE SWITCH
GUIDE TENSION CAM
GEAR CAM MAIN
LEVER CAM
HOLDER FPC SUB
MOTOR CAPSTAN
GEAR CAPSTAN
SLIDE MAIN
GEAR PULLY

Fig 1-17

## 1-4-5 Stop → REW


Push REW Key.
Motor Loading rotates forward.
Drum rotates forward
Gear Worm Motor Gear Worm Loading Gear Wheel,Gear Mode Switch Gear Cam Main rotate.
Silder Main moves in direction of arrow.
Arm Tension is moved in direction of arrow by switch cam of gear mode causing tension to tape
Brake S released from Reel S.
Pinch Roller moves in direction of arrow and attaches to Capstan Shaft, which puts the tape between roller and capstan shaft.
Motor Loading stops.
Motor Capstan rotates reverse.
* Motor Capstan rotates about 30 times faster than PLAY mode.
Gear Capstan, Belt Timming, Gear pully and Gear Idler rotate in order.
Reel totates 30 times faster than PLAY speed.
Reel S rotates 30 times faster than PLAY speed.

* This operation feeds tape 30 times faster than PLAY mode.

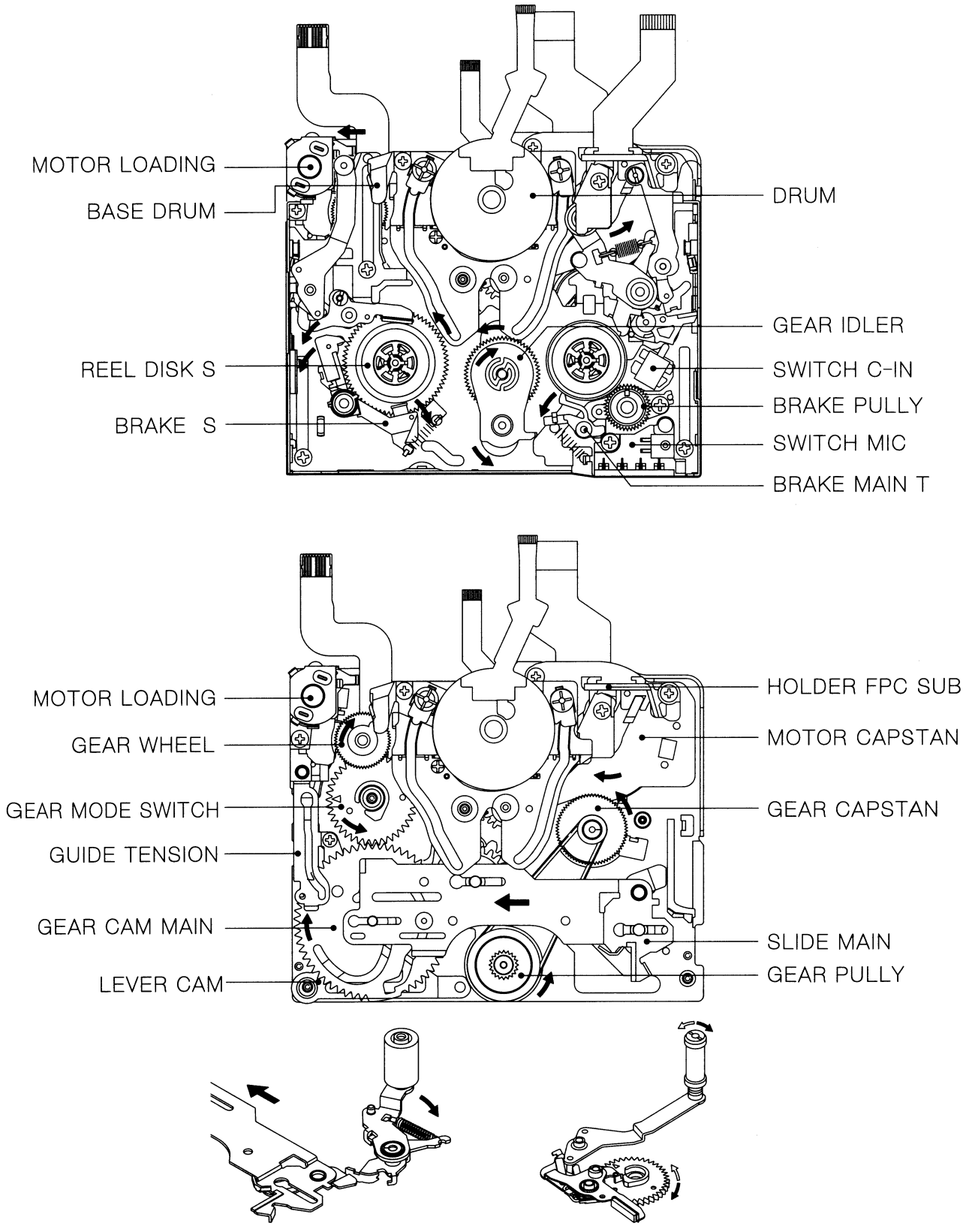
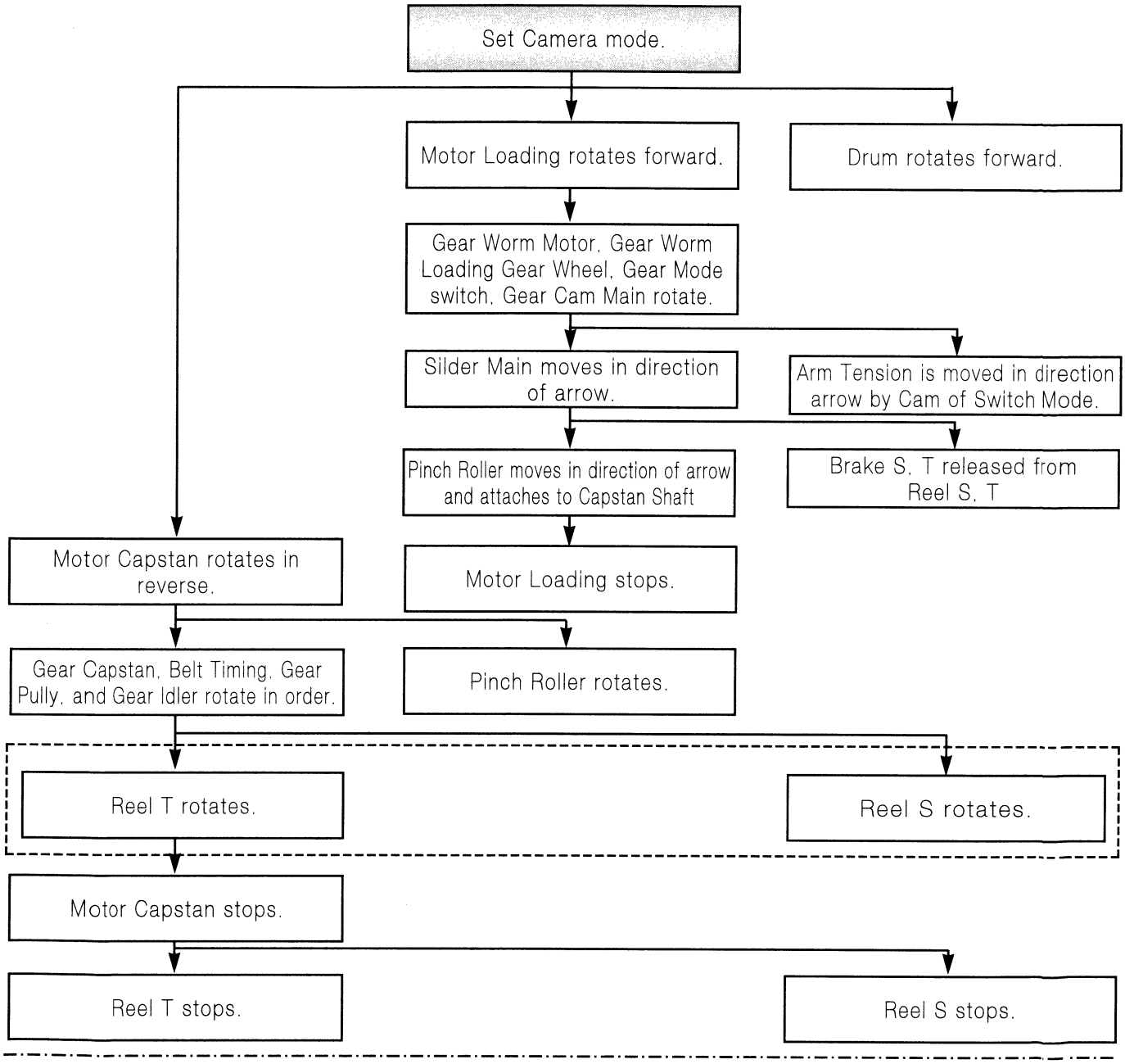
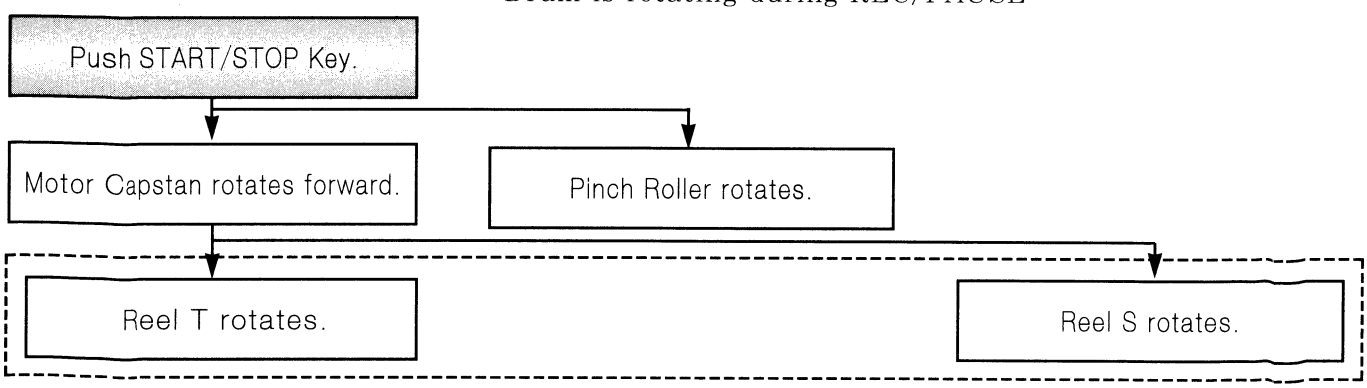

MOTOR LOADING
BASE DRUM
REEL DISK S
BRAKE S
DRUM
GEAR IDLER
SWITCH C-IN
BRAKE PULLY
SWITCH MIC
BRAKE MAIN T
MOTOR LOADING
GEAR WHEEL
GEAR MODE SWITCH
GUIDE TENSION
GEAR CAM MAIN
LEVER CAM
HOLDER FPC SUB
MOTOR CAPSTAN
GEAR CAPSTAN
SLIDE MAIN
GEAR PULLY

Fig 1-18

## 1-4-6 Stop → REC


Set Camera mode.
Motor Loading rotates forward.
Drum rotates forward.
Gear Worm Motor, Gear Worm Loading Gear Wheel, Gear Mode switch, Gear Cam Main rotate.
Silder Main moves in direction of arrow.
Arm Tension is moved in direction arrow by Cam of Switch Mode.
Pinch Roller moves in direction of arrow and attaches to Capstan Shaft
Brake S, T released from Reel S, T
Motor Capstan rotates in reverse.
Motor Loading stops.
Gear Capstan, Belt Timing, Gear Pully, and Gear Idler rotate in order.
Pinch Roller rotates.
Reel T rotates.
Reel S rotates.
Motor Capstan stops.
Reel T stops.
Reel S stops.

* Drum is rotating during REC/PAUSE




* Tape is wound to Reel T by this operation.

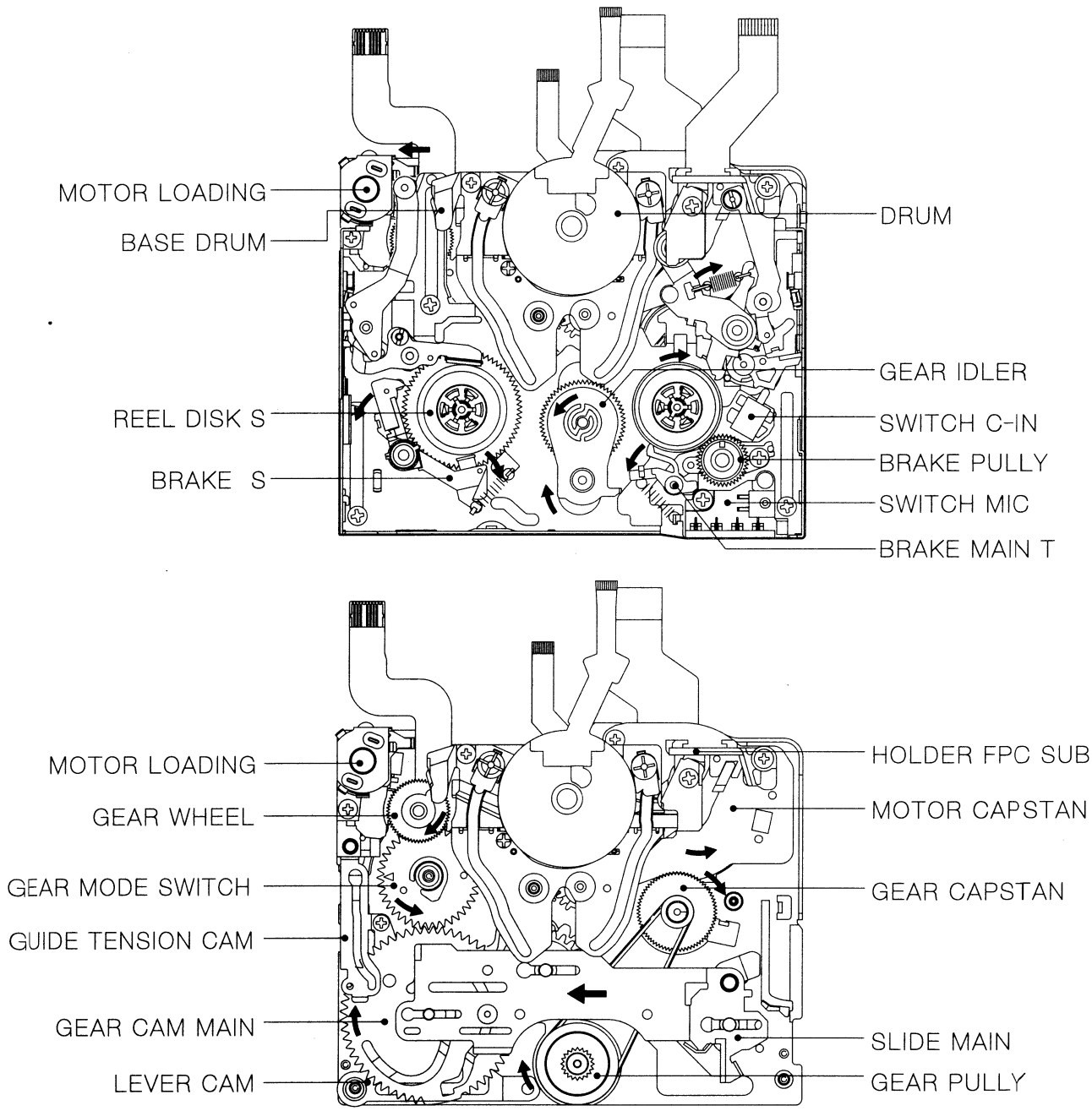
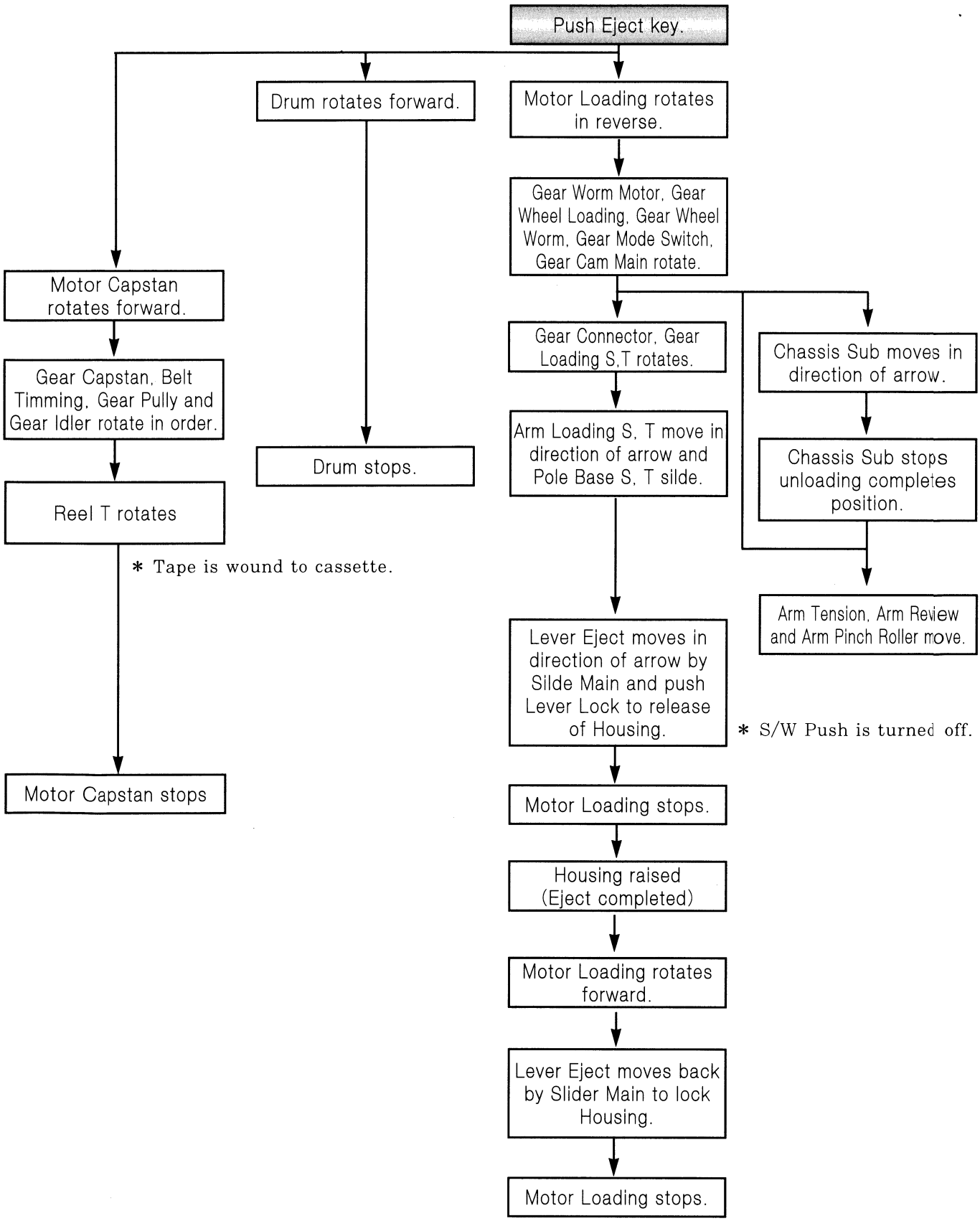
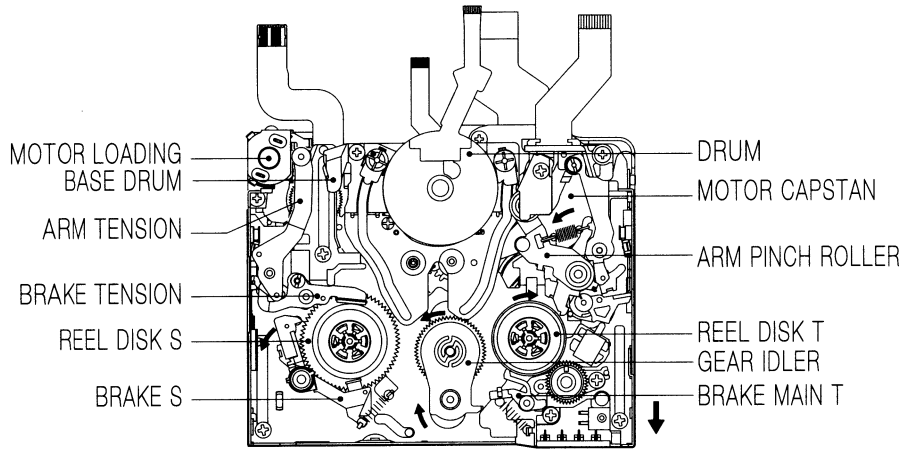
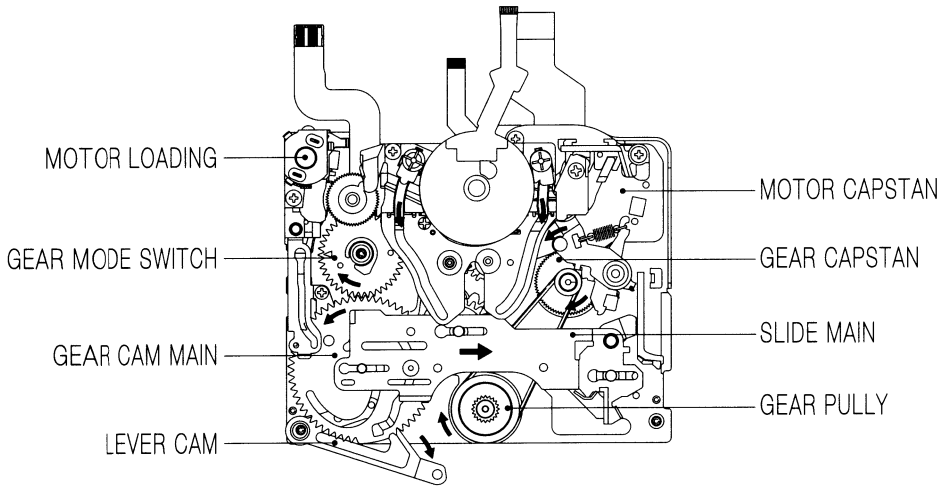

MOTOR LOADING
BASE DRUM
REEL DISK S
BRAKE S
DRUM
GEAR IDLER
SWITCH C-IN
BRAKE PULLY
SWITCH MIC
BRAKE MAIN T
MOTOR LOADING
GEAR WHEEL
GEAR MODE SWITCH
GUIDE TENSION CAM
GEAR CAM MAIN
LEVER CAM
HOLDER FPC SUB
MOTOR CAPSTAN
GEAR CAPSTAN
SLIDE MAIN
GEAR PULLY

Fig 1-19

## 1-4-7 Stop → Unload


Push Eject key.
Drum rotates forward.
Motor Loading rotates in reverse.
Gear Worm Motor, Gear Wheel Loading, Gear Wheel Worm, Gear Mode Switch, Gear Cam Main rotate.
Motor Capstan rotates forward.
Gear Capstan, Belt Timming, Gear Pully and Gear Idler rotate in order.
Reel T rotates
* Tape is wound to cassette.
Motor Capstan stops
Drum stops.
Gear Connector, Gear Loading S,T rotates.
Arm Loading S, T move in direction of arrow and Pole Base S, T silde.
Chassis Sub moves in direction of arrow.
Chassis Sub stops unloading completes position.
Arm Tension, Arm Review and Arm Pinch Roller move.
Lever Eject moves in direction of arrow by Silde Main and push Lever Lock to release of Housing.
* S/W Push is turned off.
Motor Loading stops.
Housing raised (Eject completed)
Motor Loading rotates forward.
Lever Eject moves back by Slider Main to lock Housing.
Motor Loading stops.


MOTOR LOADING
BASE DRUM
ARM TENSION
BRAKE TENSION
REEL DISK S
BRAKE S
DRUM
MOTOR CAPSTAN
ARM PINCH ROLLER
REEL DISK T
GEAR IDLER
BRAKE MAIN T


MOTOR LOADING
GEAR MODE SWITCH
GEAR CAM MAIN
LEVER CAM
MOTOR CAPSTAN
GEAR CAPSTAN
SLIDE MAIN
GEAR PULLY

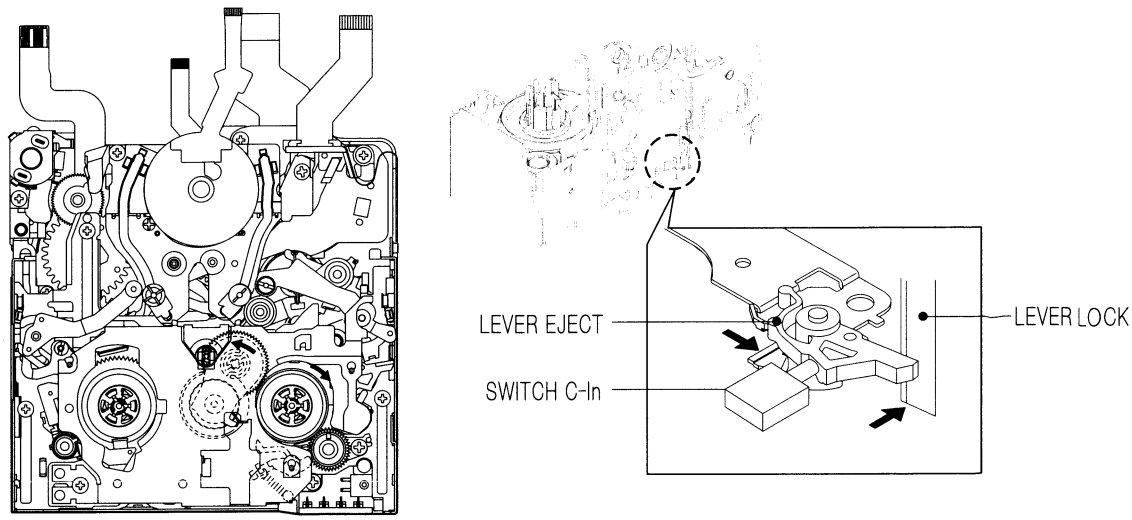
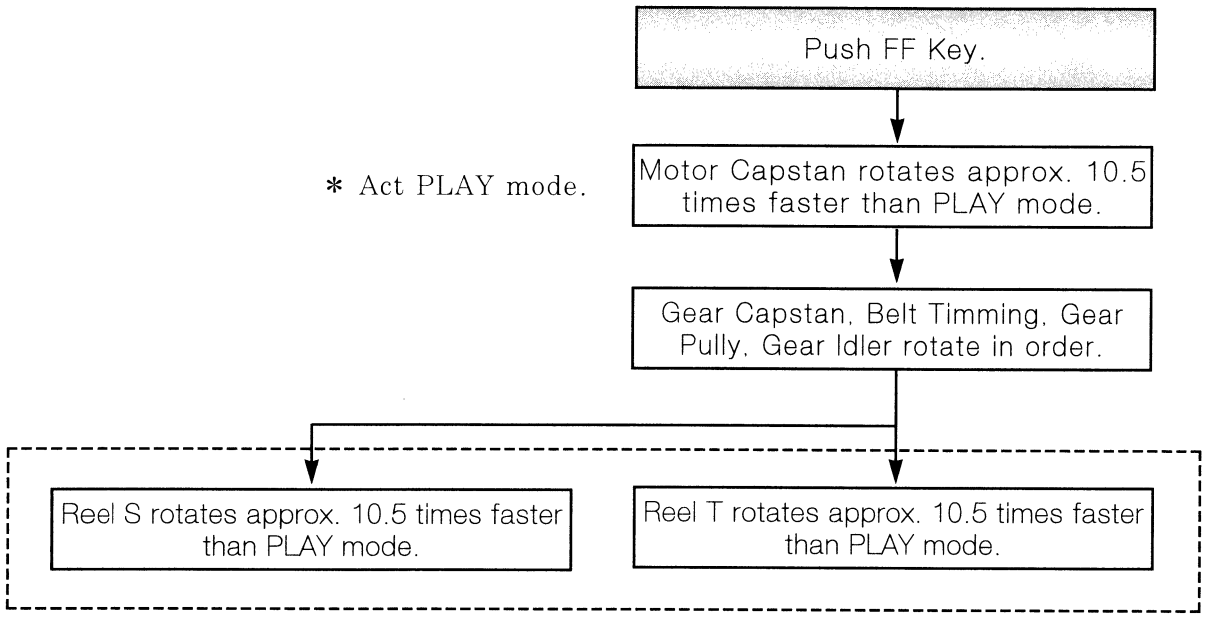

LEVER EJECT
SWITCH C-In
LEVER LOCK

Fig 1-20

## 1-4-8 CUE


Push FF Key.
* Act PLAY mode.
Motor Capstan rotates approx. 10.5 times faster than PLAY mode.
Gear Capstan, Belt Timming, Gear Pully, Gear Idler rotate in order.
Reel S rotates approx. 10.5 times faster than PLAY mode.
Reel T rotates approx. 10.5 times faster than PLAY mode.

* Tape fed by Motor Capstan is wound up to Reel T.

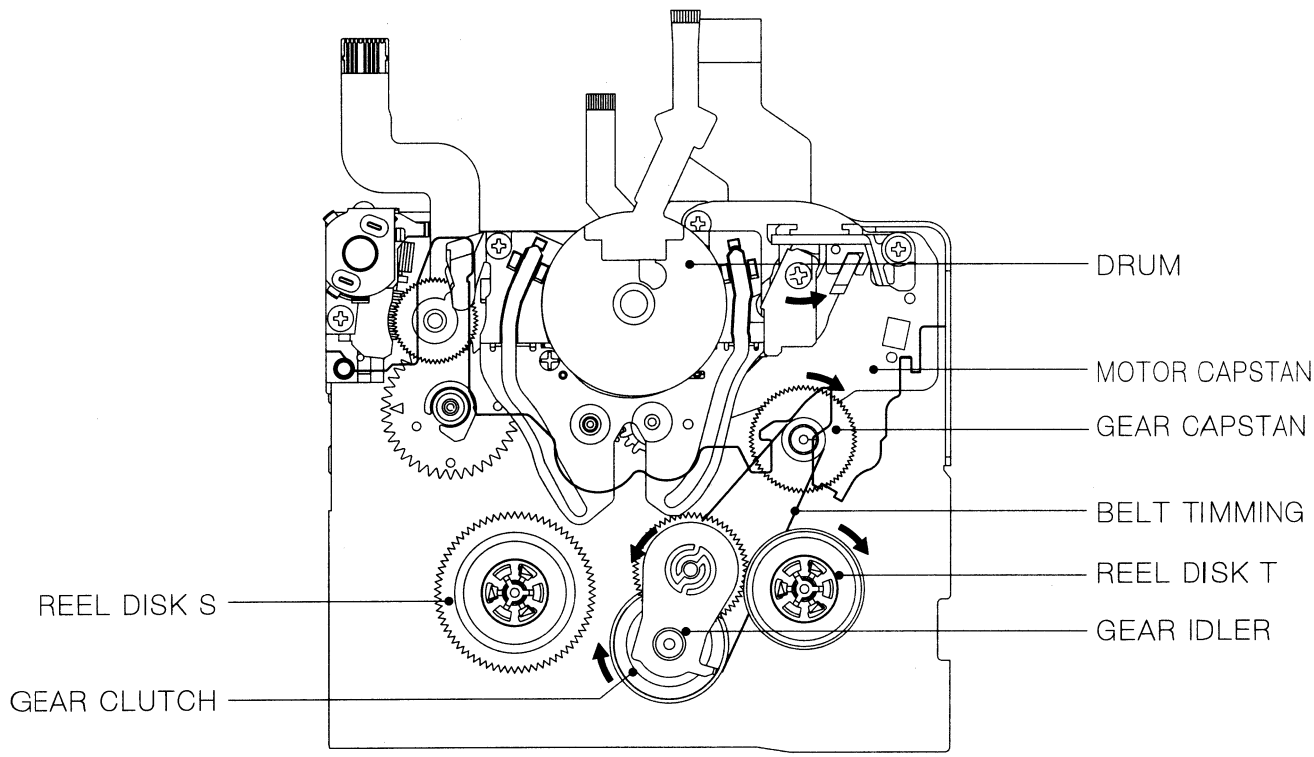
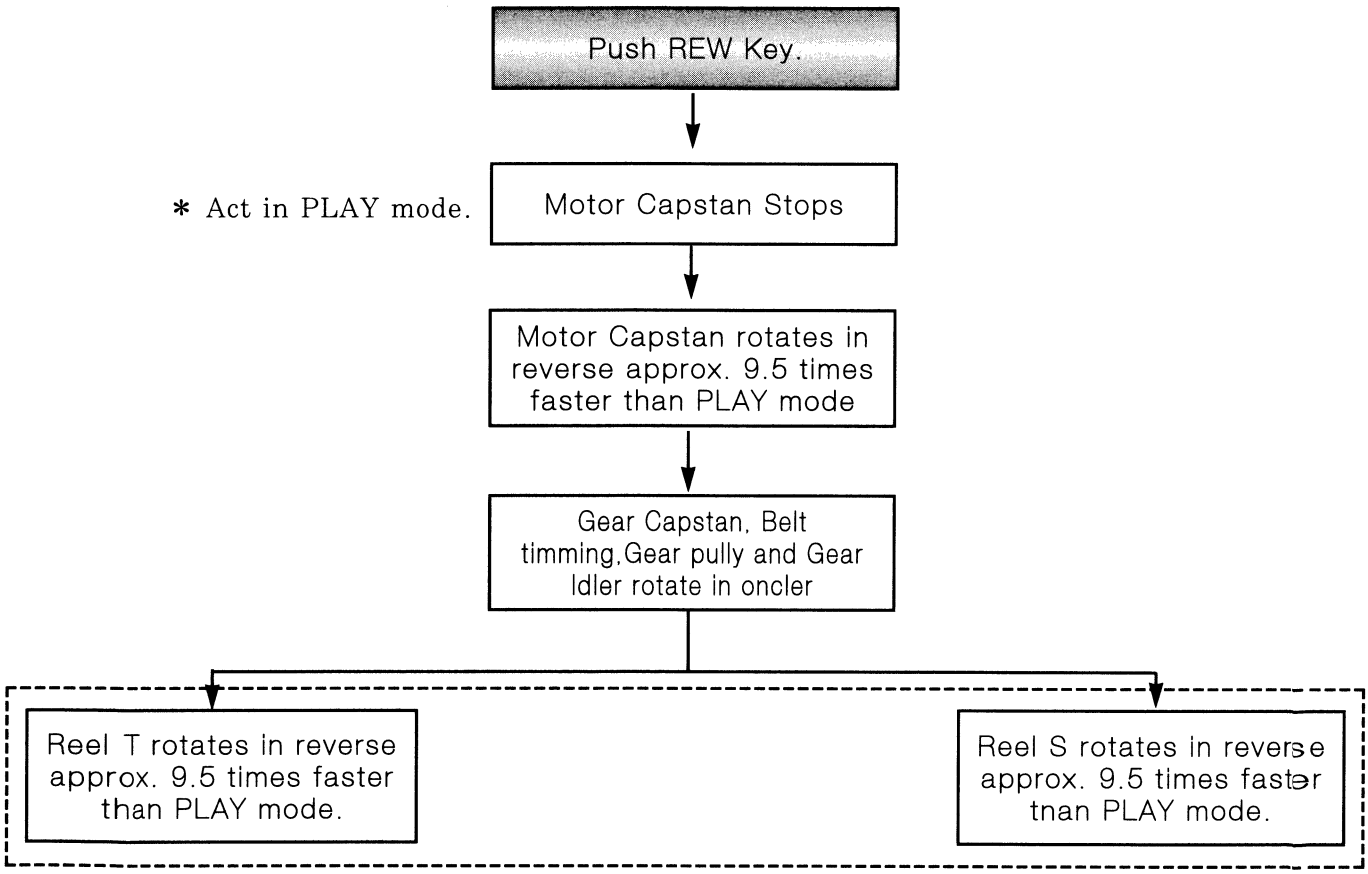

DRUM
MOTOR CAPSTAN
GEAR CAPSTAN
BELT TIMMING
REEL DISK T
GEAR IDLER
REEL DISK S
GEAR CLUTCH

Fig 1-21

## 1-4-9 REW


Push REW Key.
* Act in PLAY mode.
Motor Capstan Stops
Motor Capstan rotates in reverse approx. 9.5 times faster than PLAY mode
Gear Capstan, Belt timming,Gear pully and Gear Idler rotate in oncler
Reel T rotates in reverse approx. 9.5 times faster than PLAY mode.
Reel S rotates in reverse approx. 9.5 times faster tnan PLAY mode.

* Tape fed by Motor Capstan is wound up to Reel S.

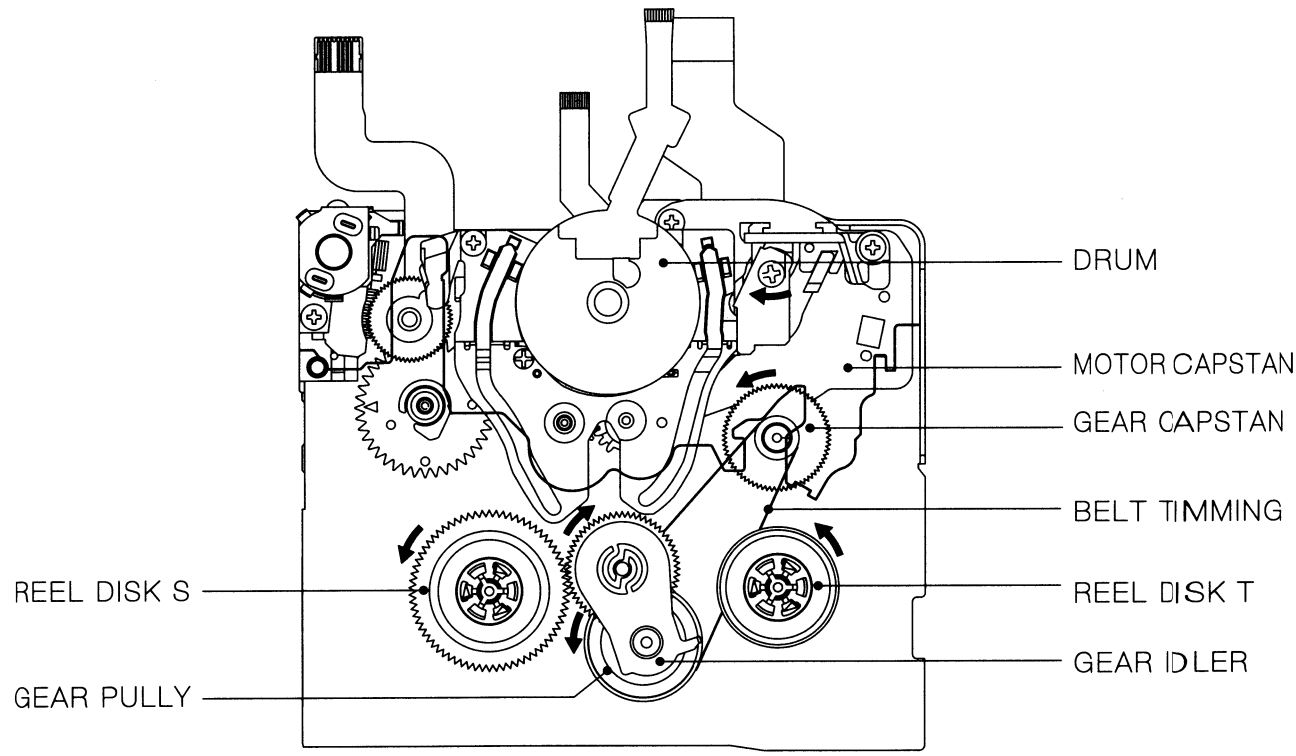

DRUM
MOTOR CAPSTAN
GEAR CAPSTAN
BELT TIMMING
REEL DISK T
GEAR IDLER
REEL DISK S
GEAR PULLY

Fig 1-22

MEMO

# 2. Adjustment

## 2-1 Operation Without Housing Assembly

1. Remove the Housing Ass'y from the recorder unit.
2. Connect the mechanical chassis to the recorder circuit to supply voltage.
3. Set to Unload mode.
4. Press the S/W Push(Keep ON status)to start loading, and push the PLAY Key.(Cover the Top/End sensor with black tape, because they do not operate.)

**Note** : For the removal of the Housing Ass'y refer to 3-2

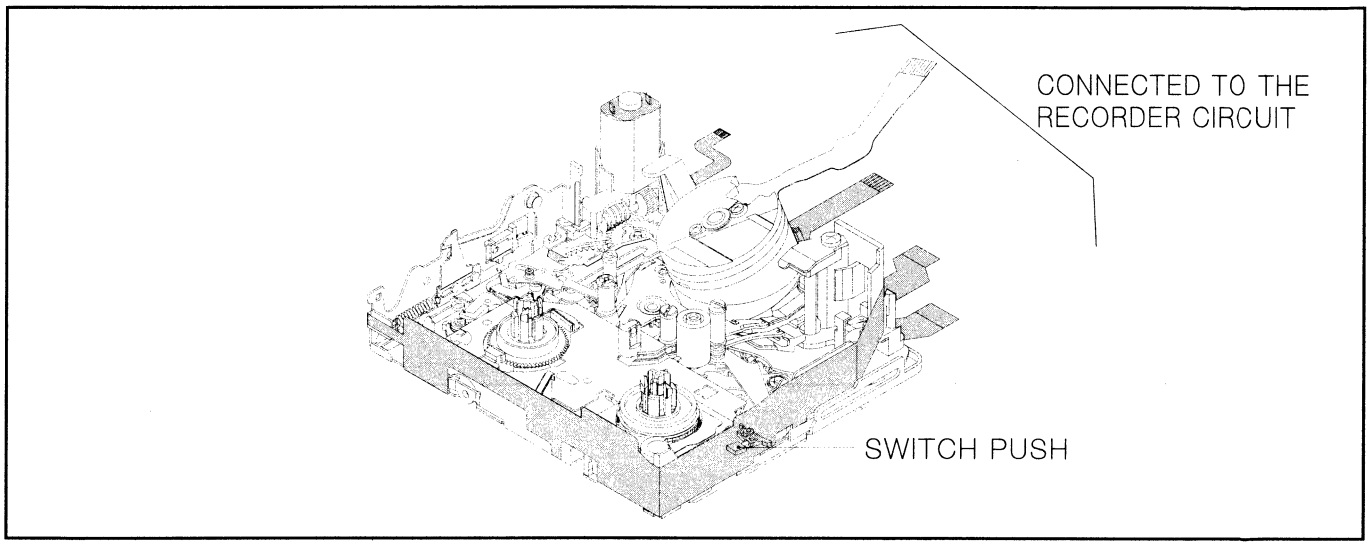



Fig 2-1

## 2-2 Setting Mechanical Mode(Without Recorder Circuit)

1. Set the power-supply output to approx.3V.
2. Choose the polarity (depending on whether loading or unloading).
3. Supply the voltage to the Motor Loading, and set to the desired mode.

**Note** : See the Table 2-1

Table 2-1

| Ⓐ | Ⓑ | Movement of Chassis |
|---|---|---|
| + | - | Loading |
| - | + | Unloading |

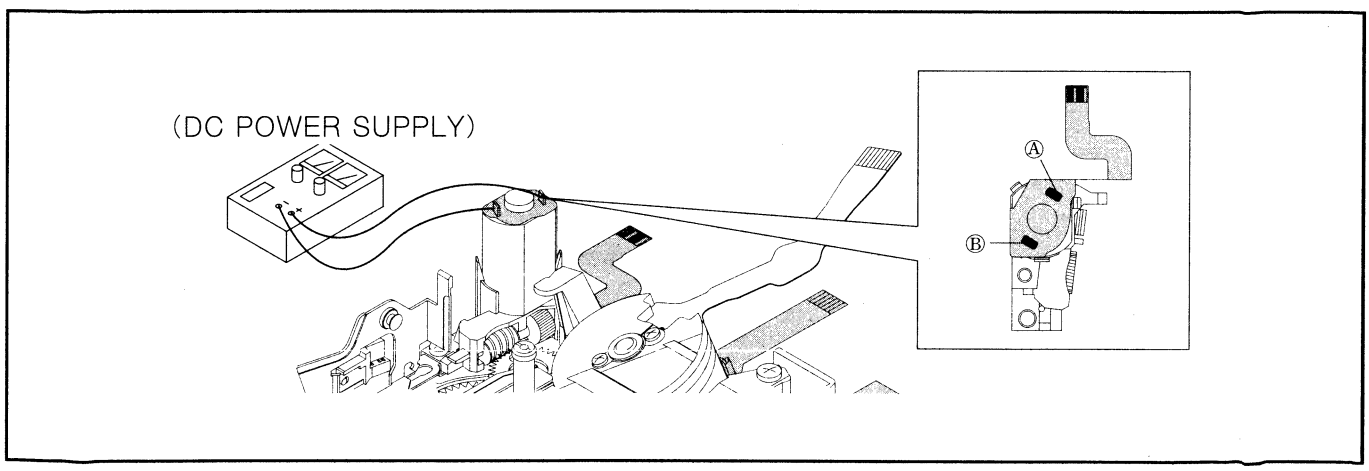



Fig 2-2

# 2-3 Maintenance

Carry out the following periodic maintenance checks in order to fully exercise all functions, operations and tape.
After repairing, service the set as follows:

## 2-3-1 Cleaning of Drum Assembly

1. Gently apply lens tissue soaked in ethyl alcohol to the Drum assembly.
   Clean the Upper Drum assembly while rotating it slowly counterclockwise(by hand).

**Note**: Do not rotate the motor by power or rotate the Upper Drum assembly clockwise. Also, the Head tip will be damaged if the lens tissue is moved in a perpendicular direction.
Be sure to follow these instructions when cleaning the Drum Ass'y

## 2-3-2 Cleaning of Tape Path

1. In EJECT mode, clean the tape path system(from Pole Tension P1 through Pole Review P7, Pinch Roller and Capstan Shaft) and the Lower Drum. Using the lens tissue soaked in ethyl alcohol.

**Note**: Make sure that no oil or grease adheres to the lens tissue.

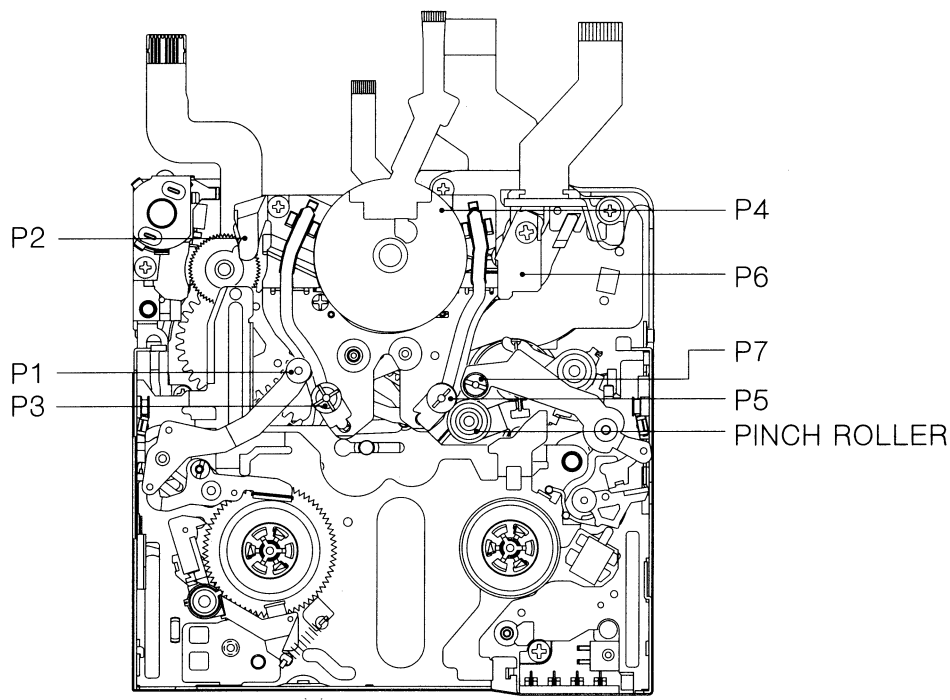



Fig 2-3

## 2-3-3 Periodic Maintenance and Check List

When overhauling, refer to the following table.

Table 2-2

| Maintenance checks | | Hours of use(H) | | | | | | | | | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 500 | 1000 | 1500 | 2000 | 2500 | 3000 | 3500 | 4000 | 4500 | 5000 | |
| Tape path system | Cleaning of tape path | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | |
| | Cleaning and degaussing of drum assembly | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | |
| Driving Sustem | Capstan Shaft | | ▲ | | ▲ | | ▲ | | ▲ | | ▲ | Never let oil get on to to the tape path surface. |
| | Gear Capstan | | ▲ | | ▲ | | ▲ | | ▲ | | ▲ | |
| | Gear Pully Shaftt | | ▲ | | ▲ | | ▲ | | ▲ | | ▲ | |
| | Belt Timing | | ◆ | | ◆ | | ◆ | | ◆ | | ◆ | |
| | Motor Loading | | ◆ | | ◆ | | ◆ | | ◆ | | ◆ | |
| Performance | Abnormal noise | | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | |
| Confirmation | Back tension | | ◆ | | ◆ | | ◆ | | ◆ | | ◆ | |
| | Brake system | | ◆ | | ◆ | | ◆ | | ◆ | | ◆ | |
| | PB, REV torque measurement | | ◆ | | ◆ | | ◆ | | ◆ | | ◆ | |

● : Cleaning ▲ : Oil ◆ : Confirmation

* When lubrication bearings, be sure to keep the oil free of dust. (Oil contaminated with dust might cause the bearings to wear out or seize.)

* A "drop" of oil is defined as the amount attached to the tip of a ø 2㎜ stick as shown in Fig. 2-4.

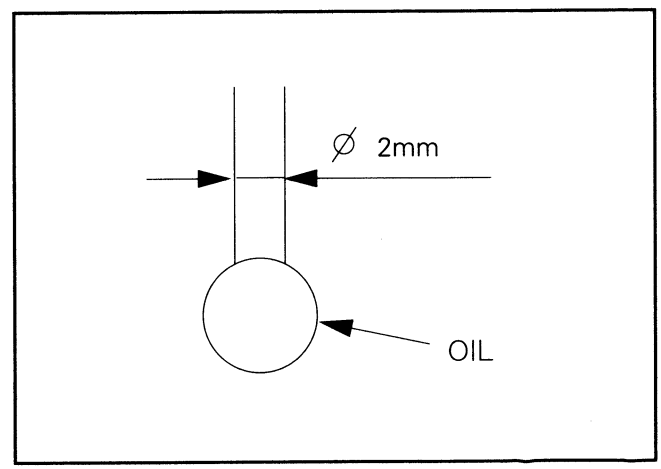



Fig 2-4

# 2-4 Mechanical Check and Adjustment

## 2-4-1 Tension Regulator Adjustment

### 2-4-1(A) DISASSEMBLY

1. Refer to 3-2 to remove the Housing Ass' y

### 2-4-1(B) ADJUSTMENT

1. Set to PB mode (without cassette tape).
2. Check that the distance between external surface of Holder Loading and center of Arm Tension is 0~1㎜. (Fig 2-5 )
3. If necessary, proceed to step 4.
4. If the Arm Tension ❶ is located inside the position specified, adjust the Band Adjust Tension ❷ toward arrow A. (If it is located outside, adjust toward arrow B.)

**Note**: Check if the Arm Tension can be moved toward arrow C in PB mode.

### 2-4-1(C) REASSEMBLY

1. Refer to 3-2 to mount the Housing Ass' y

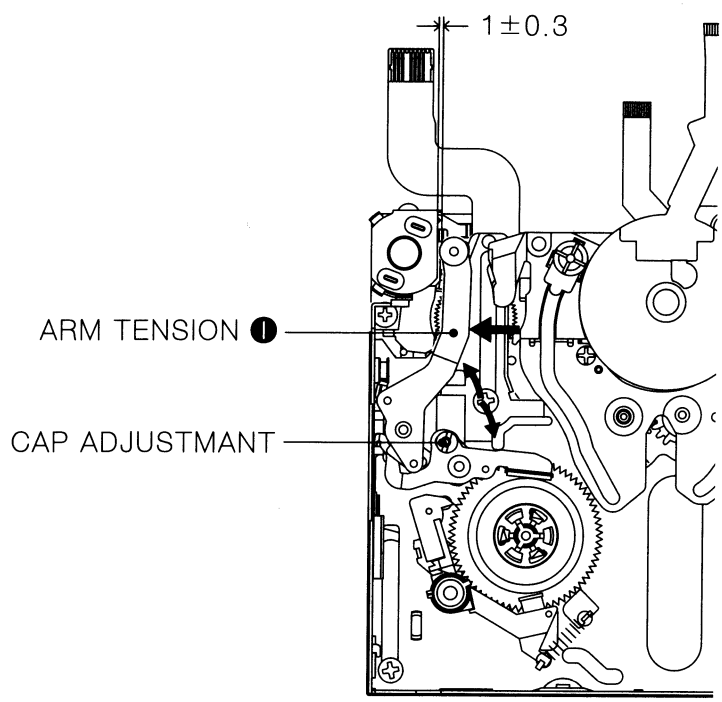



Fig 2-5

## 2-4-2 Back Tension Confirmation

1. Set up the cassette-torque tape.
2. Set to CAMERA mode, push the EDIT(+) KEY and check that the torque value of Reel S is 4.5±0.5g.cm.

## 2-4-3 PB/REV Torque check

1. Set up the cassette torque tape.
2. Set to CAMERA mode, Push the EDIT(+)Key and check that the torque value of Reel T is 7.5±3g.cm.
3. Push the EDIT(-) Key and check that the torque value of Reel S is 12.5± 3g.cm.
4. If necessary, replace the defective Gear pully Ass'y.

## 2-4-4 Reel Table Height Check

### 2-4-4(a) REMOVAL

1. Refer to 3-2 : Remove the Housing Ass'y.
2. Refer to 3-3 : Remove the Idler Ass'y

### 2-4-4(b) CHECK

1. Using vernier calipers, check the following distances : From the upper surface of the PCB Reel to the resting surfaces of Reel S,T table should each be 3.9±0.1㎜

### 2-4-4(c) MOUNTING

1. Refer to 3-3 : Mount the Idler Ass'y
2. Refer to 3-2 : Mount the Housing Ass'y

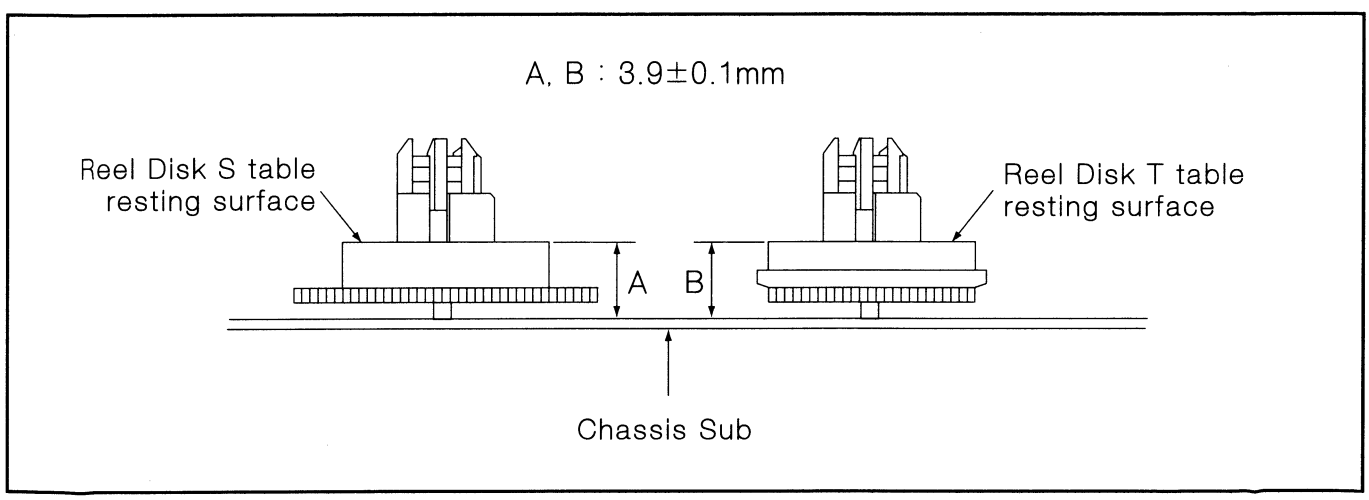



Fig 2-6

# 2-5 Tape Path Adjustment

## 2-5-1 Preparation for Adjustment

1. Clean the tape running surface(Poles, Drum, Capstan Shaft, Pinch Roller).
2. Refer to the Service Manual(page 5-1). Observe the PB RF signal and Head Switching Pulse on an oscilloscope.
3. Play back the alignment tape.
4. Check that the waveform of the RF signal is flatat both inlet and outlet(Fig. 2-7 A) If not flat (B or C in Fig 2-7), do adjustments 2-5-2 through 2-5-5.

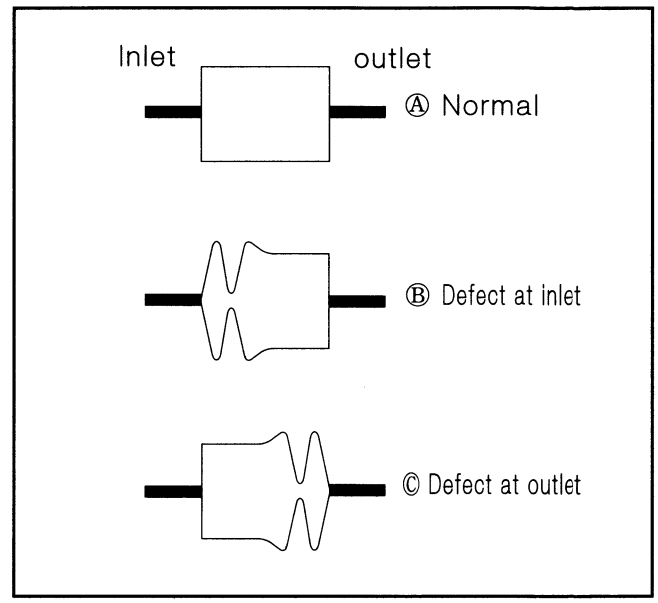



Fig 2-7

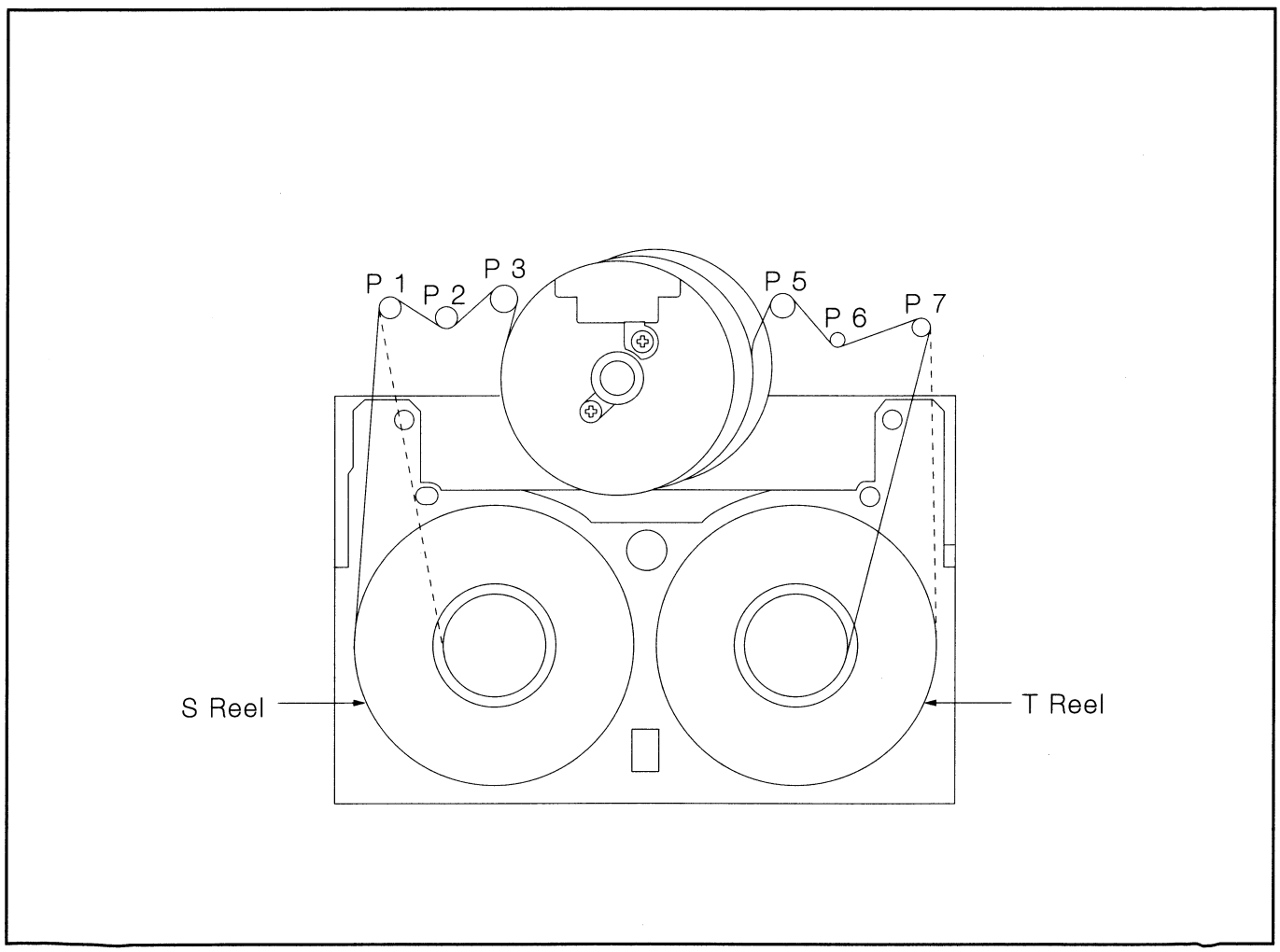



fig 2-8

## 2-5-2 Tracking adjustment

1. Play Back the alignment tape.
2. Turn P3 to flatten the waveform at the inlet
3. Turn P5 to flatten the waveform at the outlet

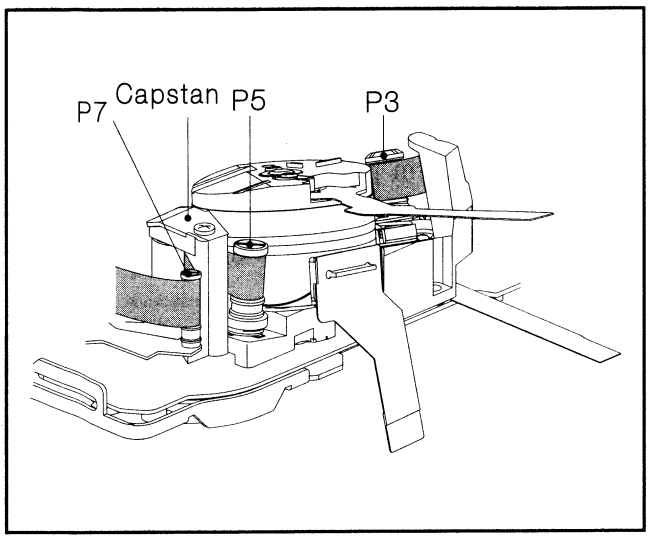



Fig 2-9

## 2-5-3 P7 Adjustment

1. Play back the alignment tape, and confirm that the tape is not twisted between the Guide Roller T and Capstan. (If the tape is twisted, turn P7, Fig 2-10)
2. Set to REV mode and observe the outlet waveform of PB RF signal.(Fig 2-12)
3. If the outlet waveform is out-of-spec, turn P7 counterclockwise, and redo steps 1 and 2.

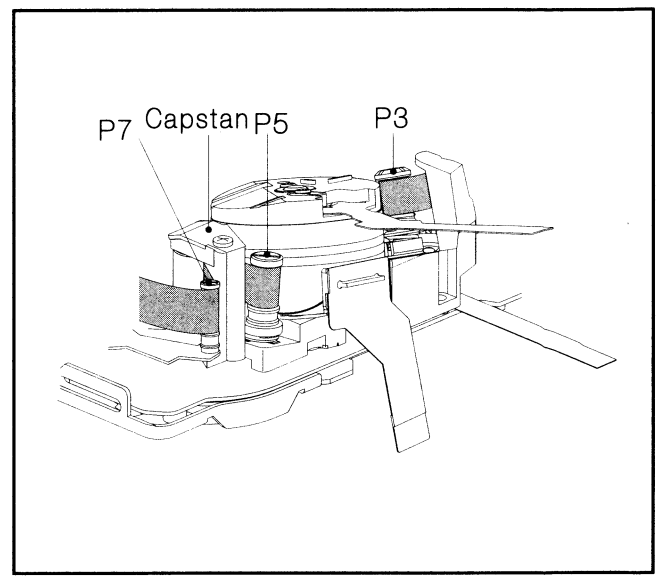



Fig 2-10

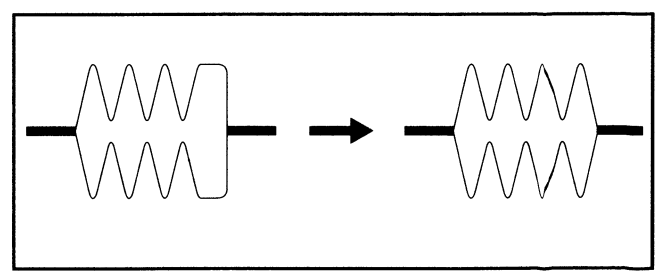


Fig 2-11

## 2-5-4 Check After Adjustment

### 2-5-4(a) TRACKING CHECK

1. Play back the alignment tape.
2. Confirm that the minimum amplitude value(E min.)is 80% of the maximum value(E max.)or larger.(Fig. 2-12)
3. Confirm that no large fluctuation occur on the waveform.(Fig. 2-13)

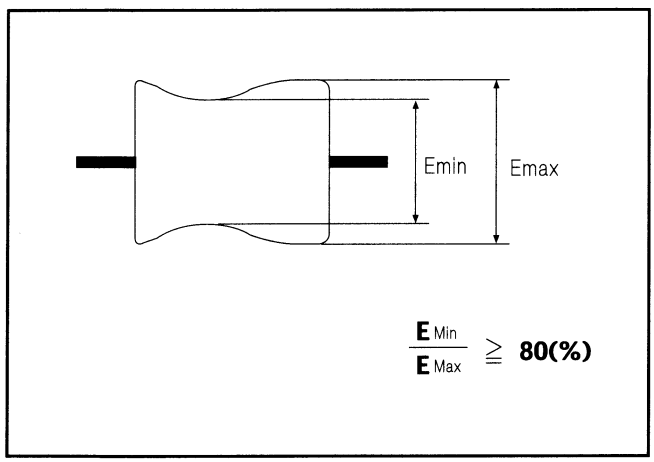



Fig 2-12

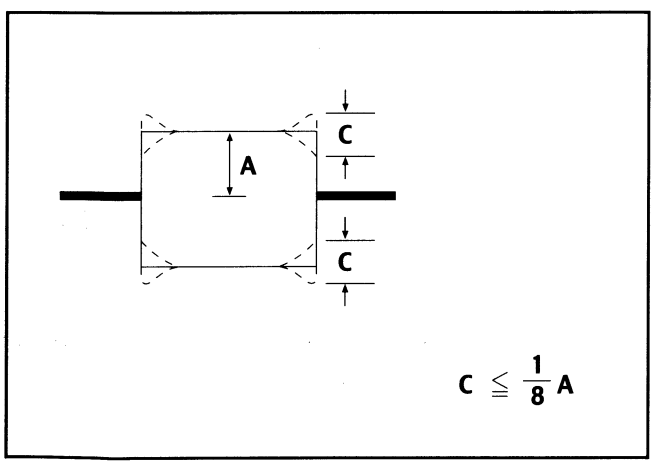



Fig 2-13

### 2-5-4(b) CUE AND REV CHECK

1. Play back the alignment tape, and set to REV mode.
   Confirm that the waveform peaks have a uniform Pitch.(Fig 2-14 A)
   If the track pitch is not uniform, do section 2-5-2 (Tracking adjustment)and 2-5-3(P7 adjustment)
2. Set to CUE mode.
   Confirm that the waveform peaks still have a uniform pitch. (Fig. 2-14 B)
   If the track pitch is not uniform, do section 2-5-2(Tracking Adjustment)

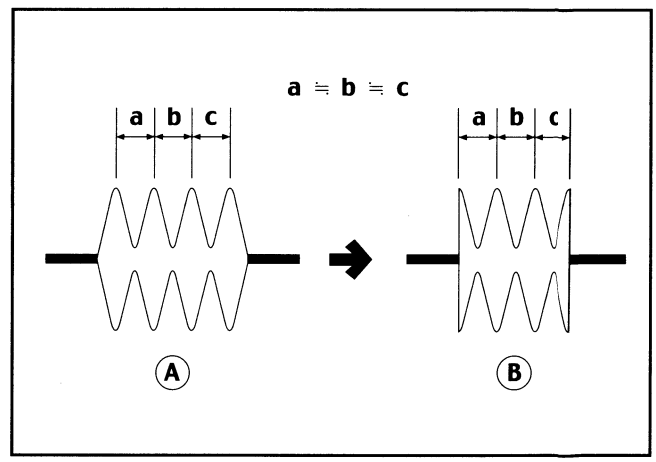



Fig 2-14

## 2-5-5(C) RISE TIME CHECK

1. Play back the alignment tape.
2. Set to playback mode, and confirm that the waveform of PB RF signal rises flat within 3 seconds. Also confirm that the tape is not twisted or curled around the Pinch Roller.(Fig 2-15)
3. Run the tape in CUE/REV and FF/REW modes, then playback. Confirm the waveform of PB RF signal rises flat within 3 seconds. Also confirm that the tape is not twisted or curled around the Pinch Roller.
4. Repeat steps 2. and 3.

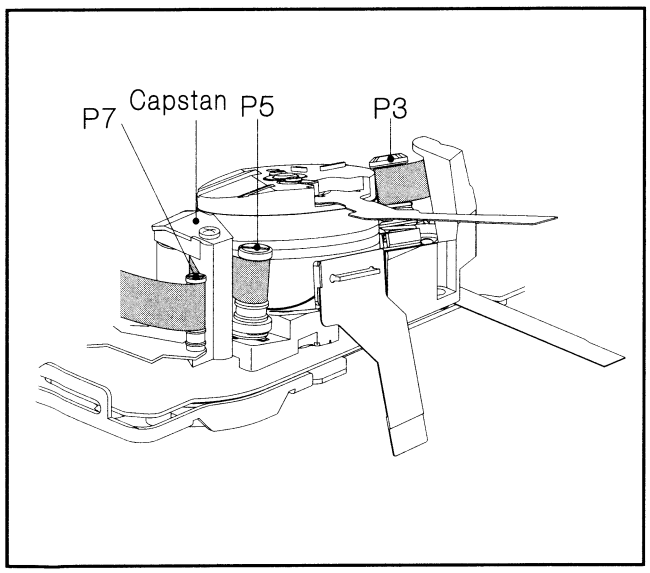



Fig 2-15

## 2-5-4(D) TAPE PATH CHECK

1. In CUE and REV modes, check that the tape is not curled around the P1, P3, P5 upper flange and P7 upper/Lower flanges.

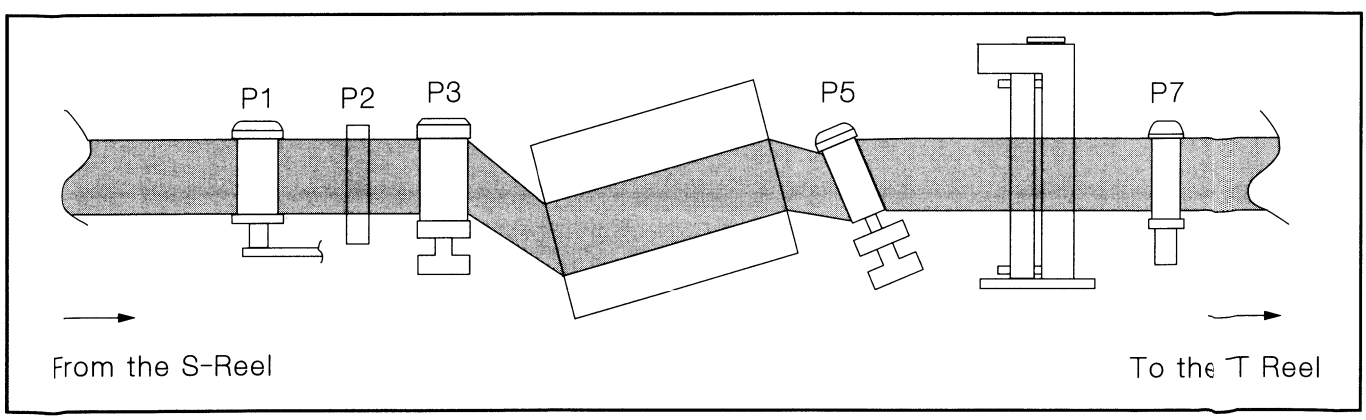



Fig 2-16

# 3. Disassembly and Reassembly

## 3-1 How to Load and Unload (Setting the Mechanical Modes)

1. Set the power-supply output to approximately 5V, and connect it to the Motor Loading.
2. Choose the polarity depending on whether loading or unloading.(See Table 3-1)
3. Supply the voltage to the Motor Loading.

Table 3-1

| Ⓐ | Ⓑ | Movement of chassis |
|---|---|---|
| + | - | Loading |
| - | + | Unloading |

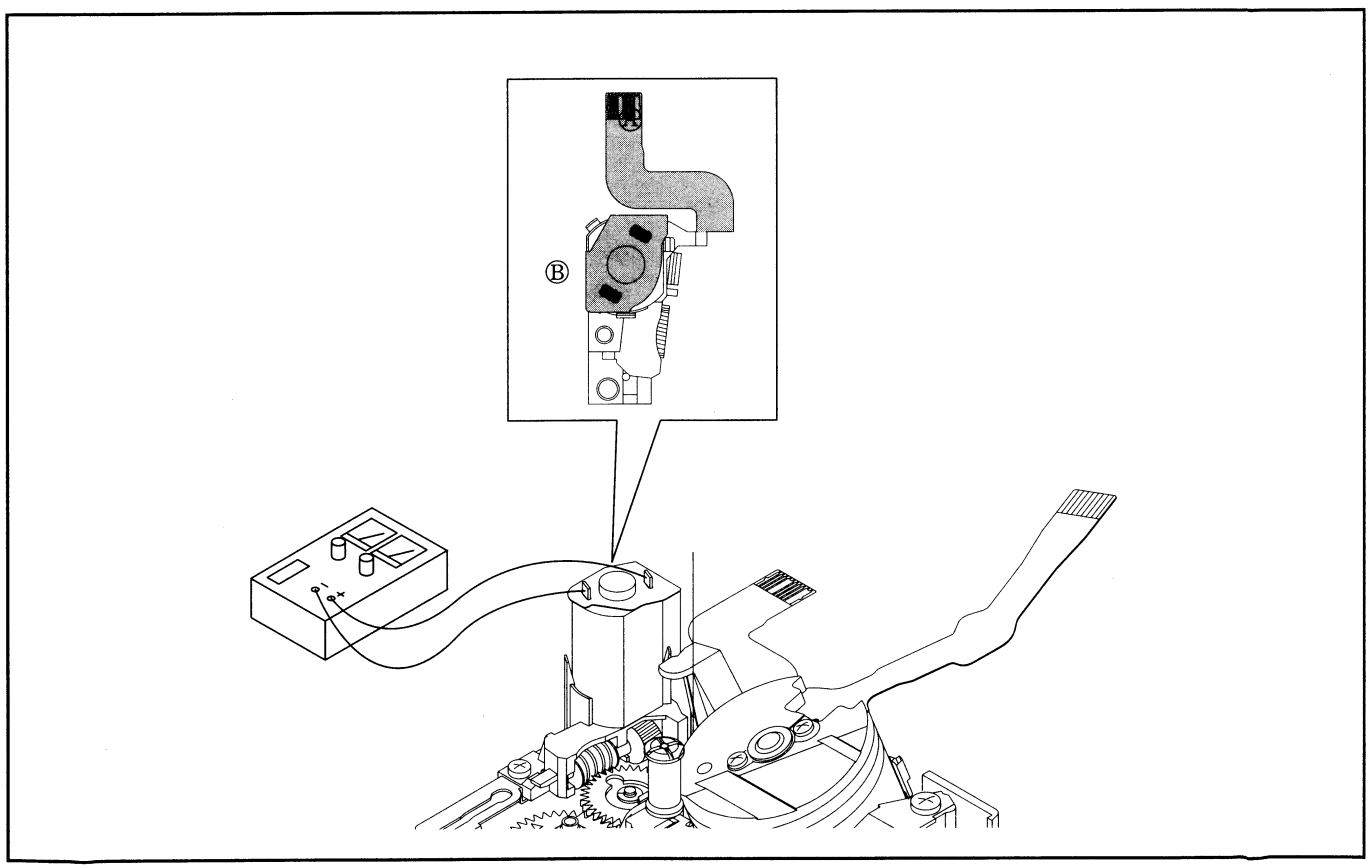



Fig 3-1 Loading and UnLoading

# 3-2 Housing

## 3-2-1 Disassembly

NOTE : Do disassembled and reassembly in the unloading

1. Push the Lever(see arrow, Detail A) turn the Lever Lock❶in the direction of arrow B, and open the Housing.
2. Remove the screw ❷ ,and separate the Hook L and Hook R and then lift it.
3. Separate the Lever L ❹ and Lever R from the Stud-housing L ❺ and stud-housing R ❻, and then lift the Housing Ass'y.

## 3-2-2 Reassembly

1. Mount the Cam L and Cam R of Lever Housing ❹ to stud Housing L ❺ and stud Housing R❻.
2. Put the Hook L ❸ and Hook R into the Sub chassis ❽, pushing them in the direction of A, and then reassembled Housing Ass'y ❼ into the Sub chassis ❽.
3. Secure the screw ❷

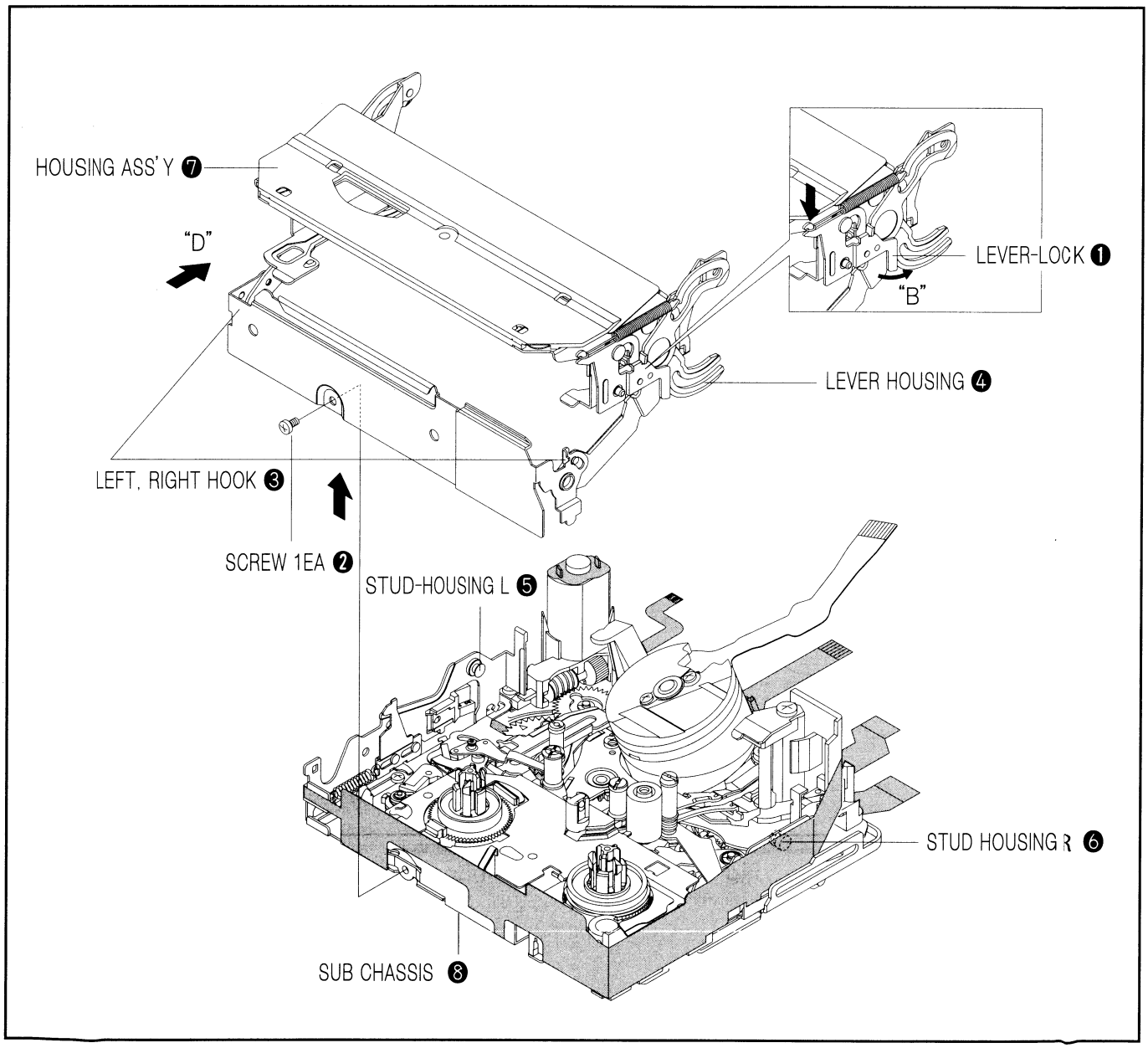



FIG 3-2 HOUSING

# 3-3 Cover Reel Ass'y, Idler Ass'y

## 3-3-1 Disassembly

1. Remove the screw ❶, then lift the Cover Reel Ass'y ❷ in the direction of arrow.
2. Remove the Washer Slit ❸, then lift the Idler Ass'y ❹.

## 3-3-2 Reassembly

1. Fit the Idler Ass'y ❹ into the Pin, then install the Washer Slit ❸ .
2. Mount the Cover Reel Ass'y ❷ to the Sub chassis in the reverse direction of arrow.
3. Secure the screw❶.

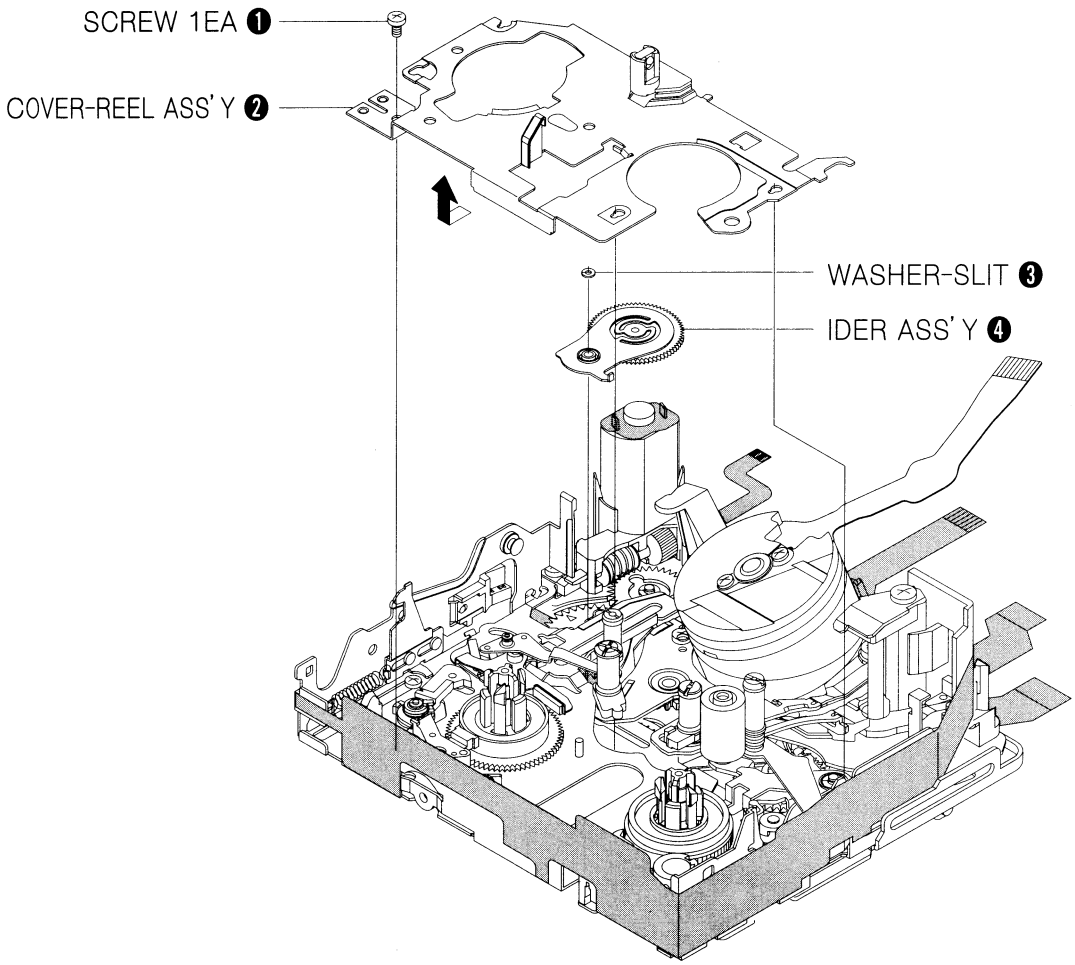



Fig 3-3 Idler

# 3-4 Sub Chassis

## 3-4-1 Disassembly

**Note 1** : when disassembling, take care not to damage any parts. Do not stain the rollers and poles with oil or grease.
**Note 2** : Always remove the Sub-Chassis Ass'y When the Deck Ass'y is in unload mode.

1. Released Sub-FPC
2. Remove 3 screws ❶
3. Lift the Sub-chassis Ass'y ❺ from Main-chassis Ass'y ❻.

## 3-4-2 Reassembly

1. Push the arm Tension Ass'y ❹ in the direction of arrow A, insert Pin Lever Cam ❼ of main-chassis Ass'y ❸ into the Sub-chassis cam ❺ of Sub-chassis Ass'y ❷
2. Fit the screw locking holes (❸ points) of Sub-chassis Ass'y ❷ to the Guide Pin ❽ of Main-chassis Ass'y
3. Secure 3 Screws

**Note 1** : After assembling ❷ with ❺ make sure that Sub-chassis Ass'y ❷ loads and unloads correctly by applying 5V to the Motor Loading.
**Note 2** : when reassembling, confirm that pin of Arm-review insert into the Guide-Cam

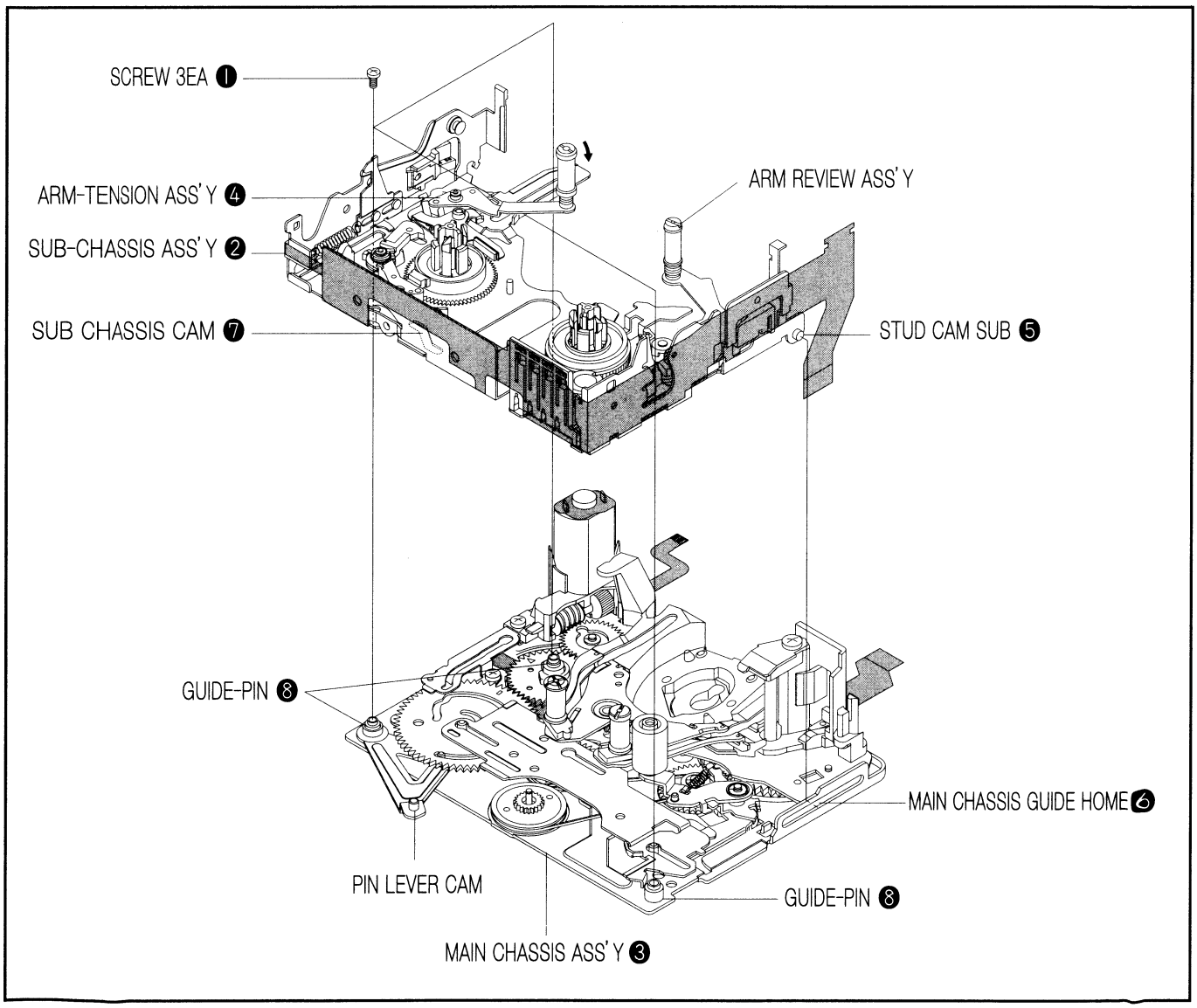



Fig 3-4 Sub Deck

# 3-5 Arm-Tension and Arm-Review

**Note** : When disassembling, take care not to deform the part. Do not stain the roller and post.

### 3-5-1 Disassembly

1. Separate the spring-Tension ❷ from Hook ❽ of sub-chassis.
2. Remove the Washer-slit⓫, and then lift up the Arm-Tension ❶.
3. Lift up the Brake-Tension ❸ and the Tension Release ❹.
4. Lift up the Arm-Review❺.

### 3-5-2 Reassembly

1. Insert the Arm Review ❺ into the pin1 ❽.
2. After Tension Release ❹ assembled to the pin 3 ⓾, Brake-Tension ❸ insert in the pin 3⓾.
3. When Arm-Tension ❶ insert in the pin 2 ❾, pin of Arm-Tension ❻ assembled into cam part ❺ of Brake Tension.
4. Assambled the Washer-slit ⓫.
5. Hang the spring Tension ❷ to the hook of Brake Tension ❸ and hook of sub-chassis ❽.

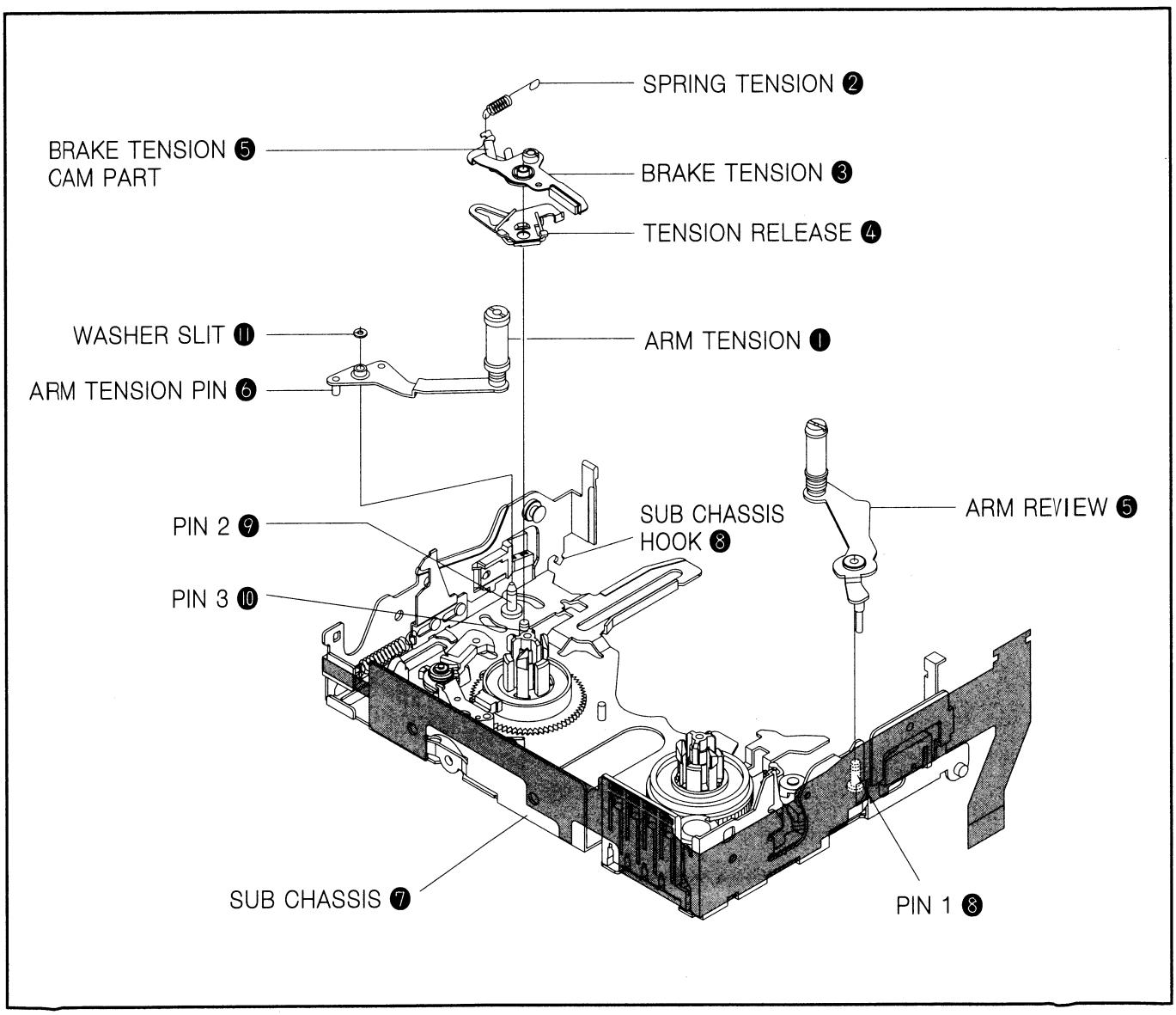



Fig 3-5 Arm Review and Arm Tension

# 3-6 Reel Disk S, T, Brake S, Brake Main T, Brake Pully, Lever Eject

## 3-6-1 Disassembly

1. Separate the spring Brake S ❺ from the spring hook ⓫, and then lift it up.
2. Remove the washer-slit ❹, lift up the Brake S ❸.
3. Separate the spring Main Brake T ❼ from the spring hook ⓫, lift up the Brake Main T ❻
4. Lift up the Reel S ❶, T ❷.
5. Remove the screw 1EA ❾, lift the Brake pully ❽.
6. Lift up the Lever Eject ⓾.

## 3-6-2 Reassembly

1. Mount the Lever Eject ⓾.

**Note** : "A" part of the Lever Eject ⓾. Put to the left of sub chassis stopper ⓬.

2. Mount the Brake pully ❽, secure the screw 1EA ❾.
3. Insert the washer slit ❶.
4. Mount the Brake main T ❻, hang the spring Main Brake T ❼ to the spring hook ⓫.
5. After Mount the Brake S ❸ and insert the washer slit ❹, and then hang the spring Brake S ❺ to the spring hook ⓫.

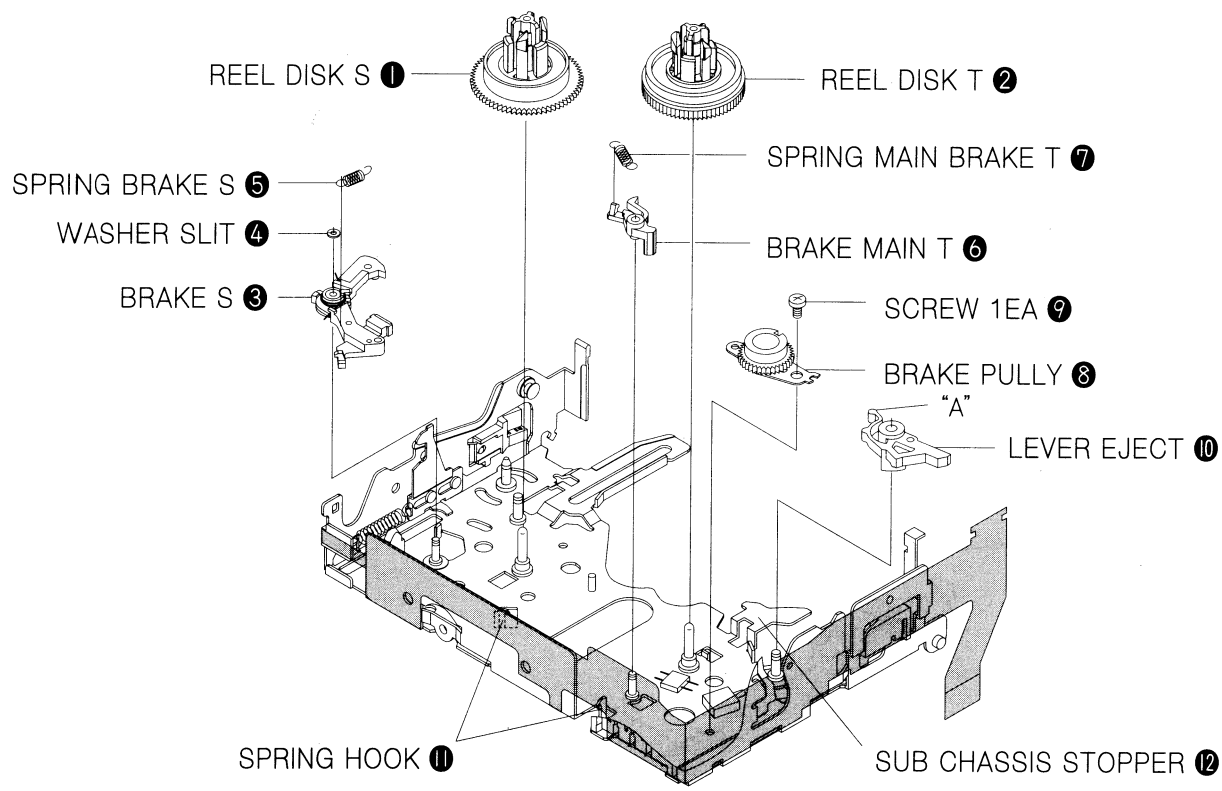



Fig 3-6 RELL DISK S, T, BRAKE S, BRAKE MAIN T, BRAKE PULLY, LEVER EJECT

# 3-7 DRUM

## 3-7-1 Disassembly

**Note1**: Do not touch the Head tip❷ when removing or reassembling the Drum❶.
**Note2**: Do not touch the Roller S❼, T❽ when removing or reassembling the Drum❶.

1. Remove 1 screw ❹ and then remove the spring plate Drum ❸.
2. Remove the Drum ❶.

## 3-7-2 Reassembly

1. Mount and insert the Drum ❶ to the Bosses ❺.
2. Insert the spring plate Drum ❸, and secure the screw ❹.

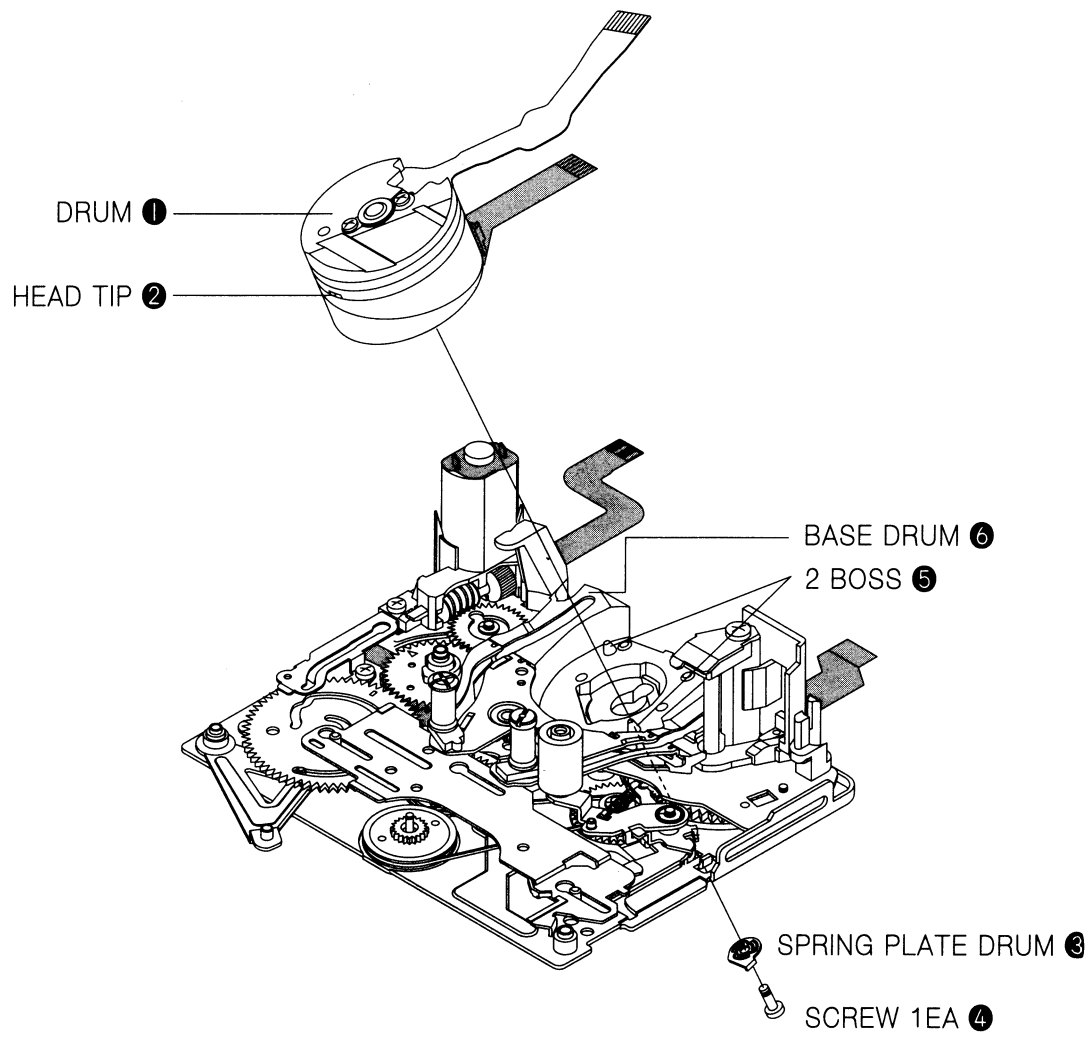



Fig 3-7 DRUM

# 3-8 Guide Rail Ass' y

## 3-8-1 Disassembly

**Note1**: When removing or reassembly, do not touch Guide Roller S ❹ and Roller T ❺.(Protection Stein)
**Note2**: When removing or reassembly,the Guide Roller S ❹ and T ❺, be careful not to deform the Guide Rail❷(pushing the cautious)

1. Remove the screw 3 ❶ in the up and the screw 1 ❼ in the back, lift up the Guide rail ass' y ❷.
2. Separate it and turn to count clock wise the Guider Roller S ❹ and T ❺, and then separate the spring Guide Roller 2 ❻.

## 3-8-2 Reassembly

1. Insert the Spring Guide Roller 2 ❻ to the pole Base S ❽ and T ❾, and then assemble the Guide Roller S ❹ and T ❺ as turn to count clock wise.
2. After Pole Base S ❽ and T ❾ unloading mode, and then assemble Guide Rail Assy ❷ to the Main chassis ❿ and secure the screw 3 ❶ in the up and the screw 1 in the back ❼.

**Note 1** : When removing and reassembling Guide Rail Ass'y, Be careful not to assemble point.
**Note 2** : Disassemble and reassemble in unload mode.
**Note 3** : After assembling, make sure that loading and unloading work correctly by applying 5V to the Motor Loading.

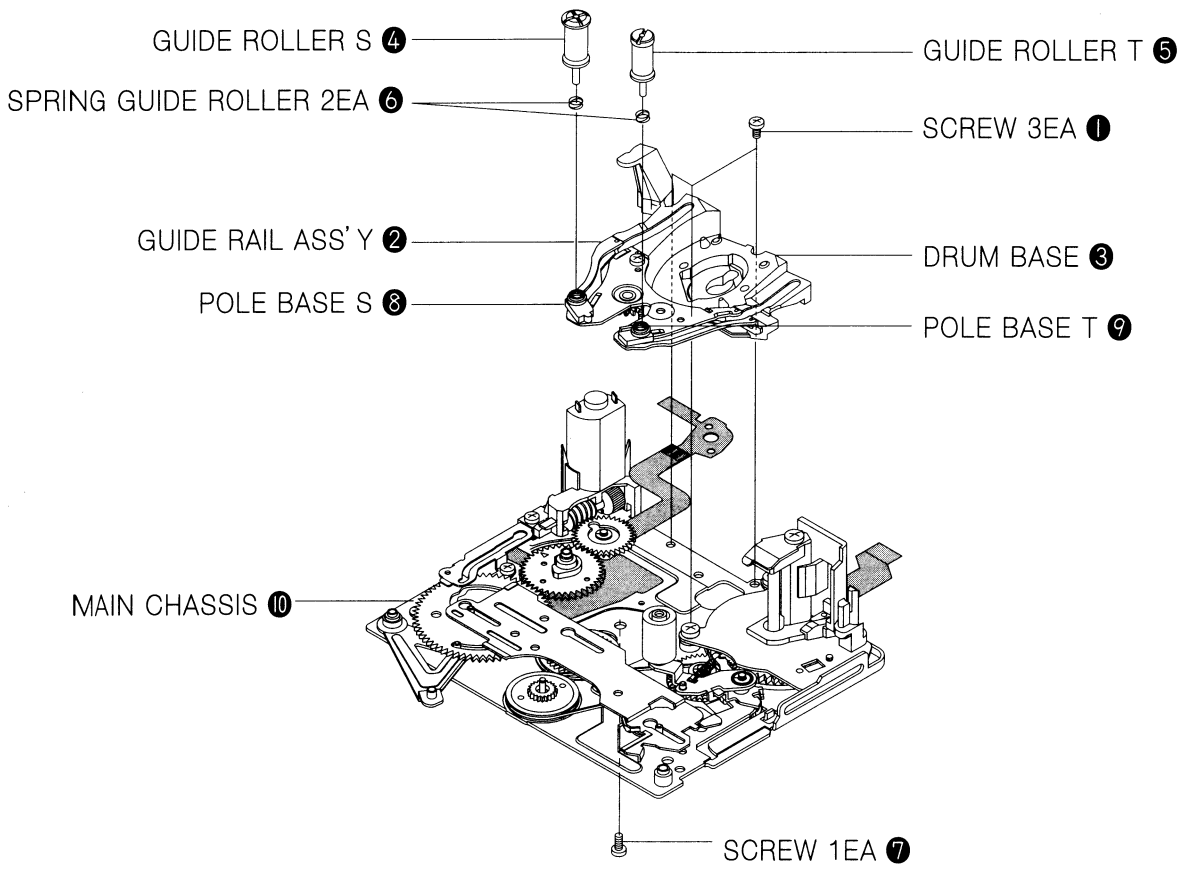



Fig 3-8 Guide Rail

# 3-9 Motor Loading, Guide Tension Cam, Gear Wheel

## 3-9-1 Disassembly

1. Eliminate pt welding 4 part ❽.
2. Remove the screw 1 ❷ and the Hooke 2 ❼, and then Lift up the Loading ass'y ❶.
3. Remove the screw 1, Lift up the Guide Tension cam ❹
4. Remove the washer slit ❺, Lift up the Gear wheel ❻

## 3-9-2 Reassembly

Reassemble in reverse order

**Note** : Be careful not to touch the hand in the dew

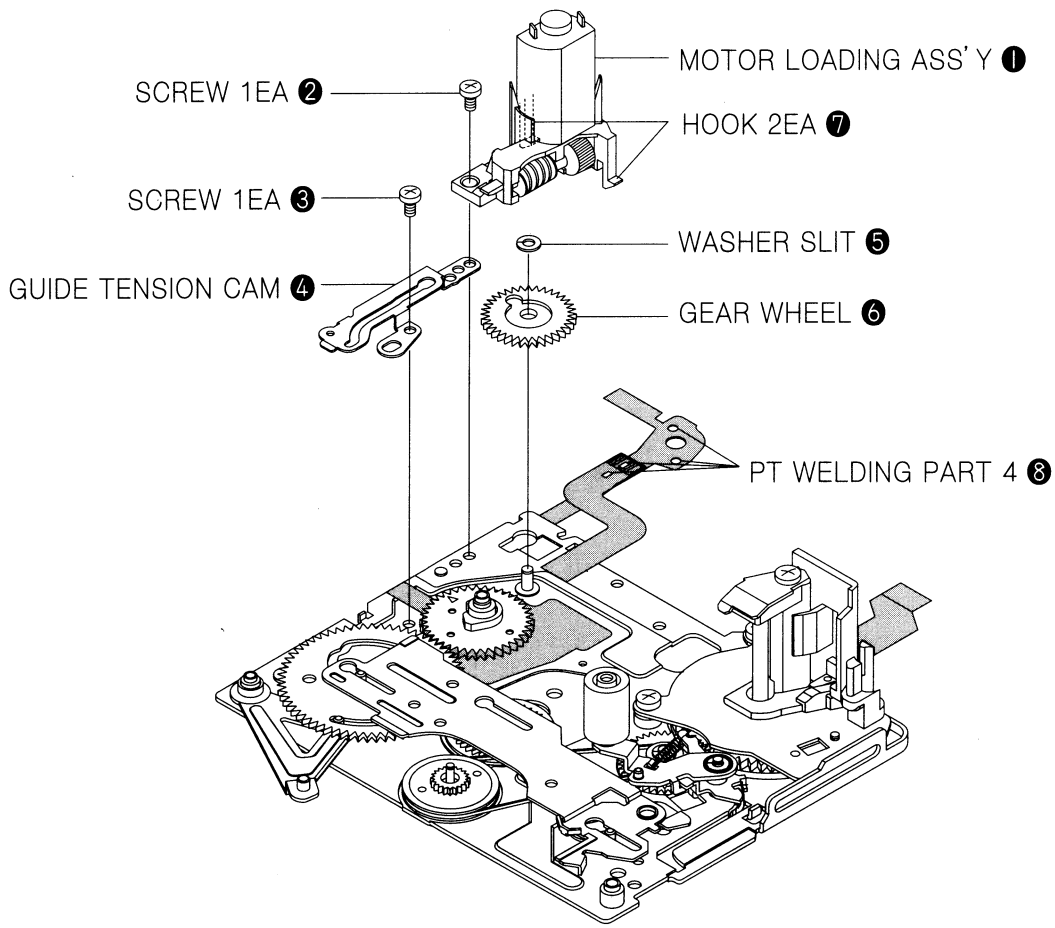



Fig 3-9 Motor Loading, Guide Tension Cam, Gear Wheel

# 3-10 Motor Capstan, Holder FPC Sub, Arm Pinch Roller, Slide Main

## 3-10-1 Disassembly

**Note 1** : When removing and reassembling, be careful not to giss the Gear Part.
**Note 2** : When removing and reassembling, be careful not to touch the hand in the pinch Roller.(Protection contamination)

1. Remove the screw 1 ❶, lift up the Holder FPC Sub ❷.
2. Remove the screw 2 ❸, lift up the motor Capstan ❹
3. Remove the washer slit ❺, separate the "A" part of spring Lever pinch ❻ to the spring hook of Arm pinch Roller ❼.
4. Lift up the Arm pinch Roller ❼.
5. Lift up the spring Lever pinch ❻.
6. Turn Gear cam main ❽ in the reverse direction of Arrow B to the End, and then lift the slide main ❾ in the direction of arrow D.

## 3-10-2 Reassembly

Reassembly in reverse order.

**Note**: When removing and reassembling, must be correspond to assemble point Gear cam main.

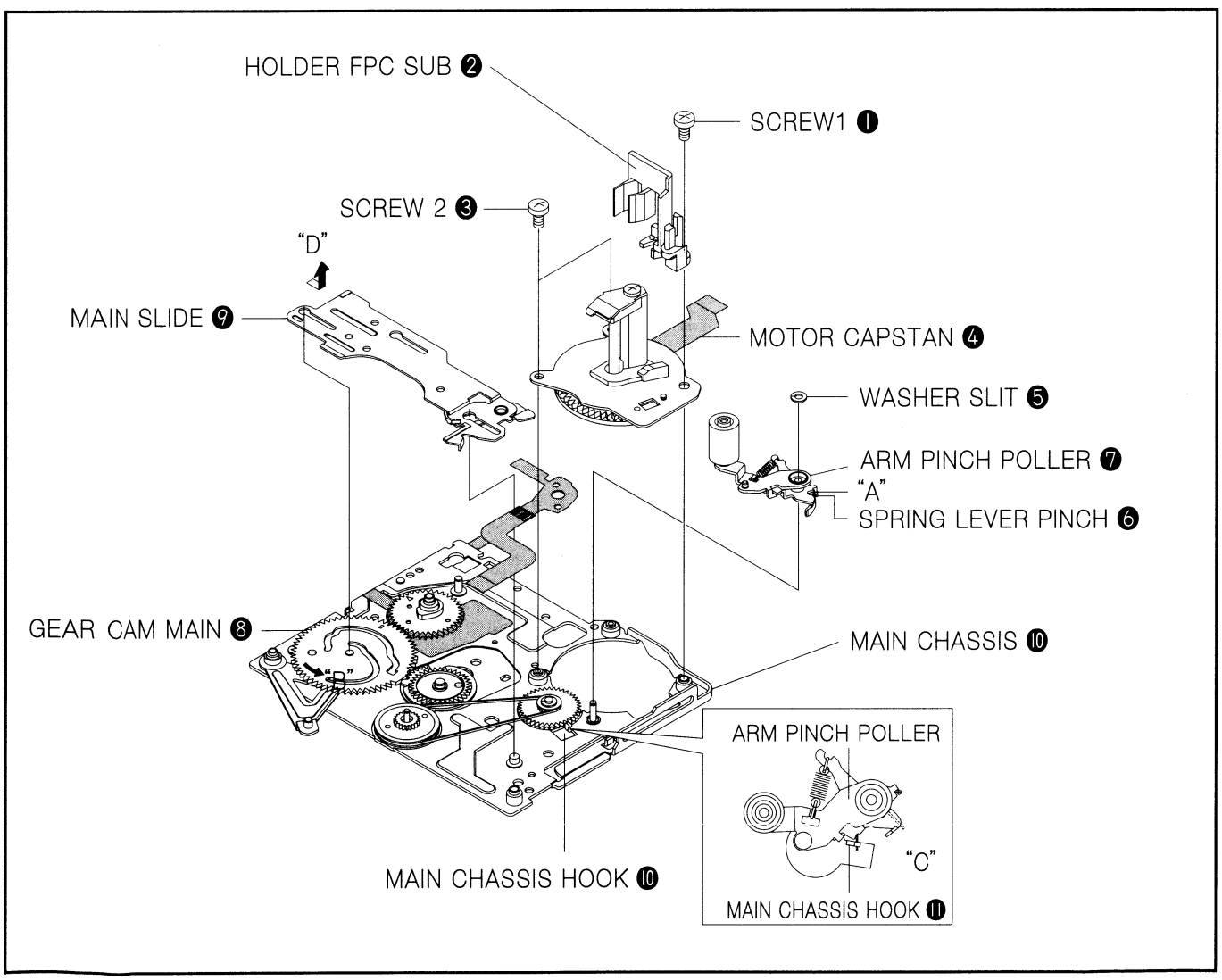



Fig 3-10 MOTOR CAPSTAN, HOLDER FPC SUB, ARM PINCH ROLLER, SLIDE MAIN.

# 3-11 Gear Cam Main, Lever Cam, Gear Connector

## 3-11-1 Disassembly

1. After lift the Gear Cam Main ❶, and then lift up the Lever Cam ❷.
2. Lift the Gear Connector ❸.

## 3-11-2 Reassembly

1. Align the hole of the Gear Connector ❸ and the Main chassis hole with Timing(B)(HOLE)
2. Align the hole of the Lever Cam ❷ and the Main Chassis hole with Timming(A)(HOLE)
3. Align the hole of the Gear Cam Main ❶ and the Main Chassis hole with Timing(C)(HOLE)

**Note** : When reassemble the Gear Cam Main, assemble the Gear Mode switch to align with Detail "D".

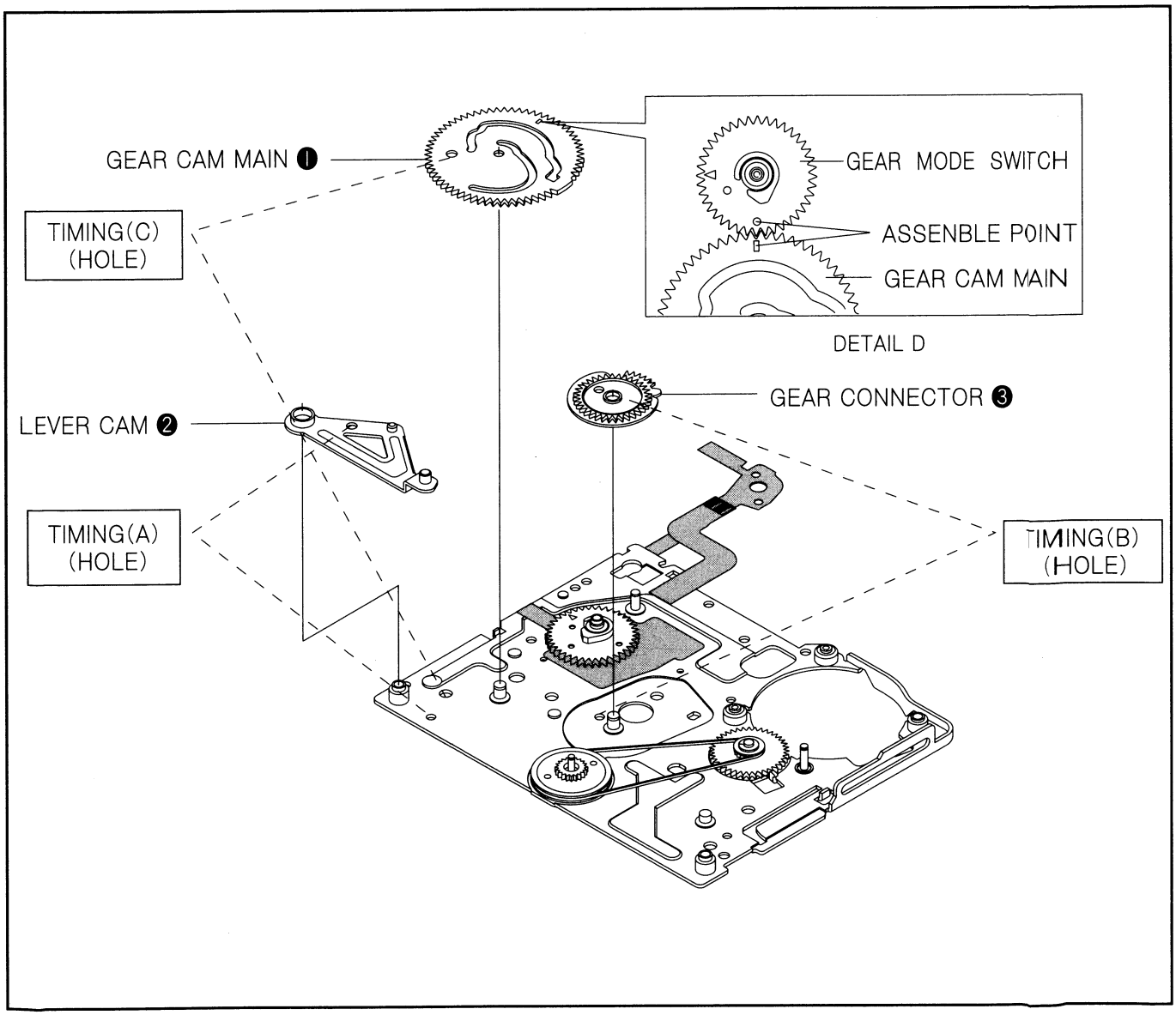



Fig 3-11 Gear Cam Main, Lever Cam, Gear Connetor

# 3-12 Gear Pully, Belt Timing, Gear Capstan

## 3-12-1 Disassembly

1. Rmove the washer slit ❶, Lift the Gear Capstan ❷
2. Separate the Belt Timing ❸ , Lift the Gear pully ❹

## 3-12-2 Reassembly

1. Mount the Gear Pully ❹ and hang the Belt Timing ❸ on the Gear Pully ❹
2. Hang the Belt timing ❸ to the upper Gear of the Gear Capstan ❷ and mount the Gear Capstan❷.
3. Assemble the washer slit ❶.

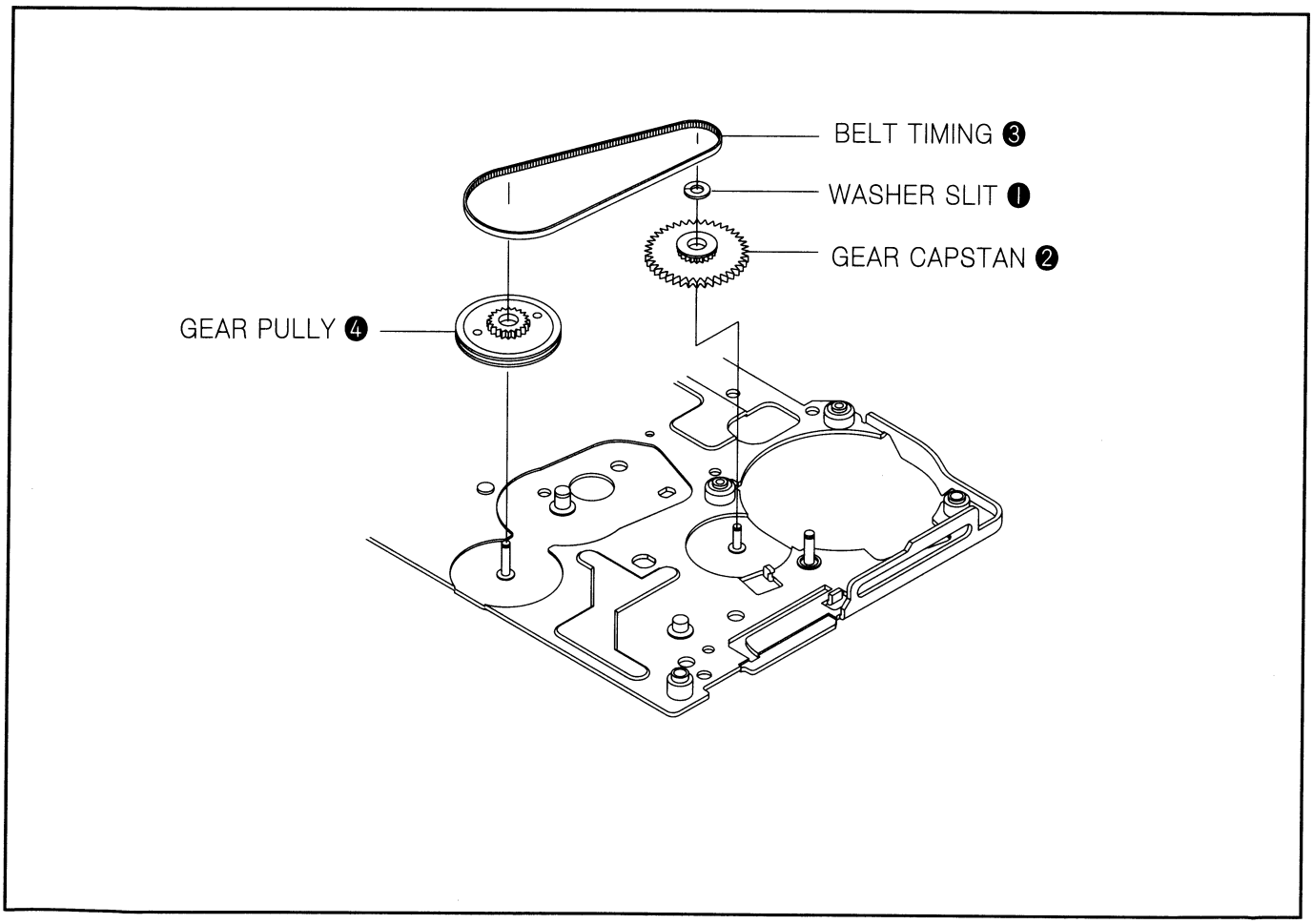



Fig 3-12 Gear pully, Belt timing, Gear Capstan